The Sinai Experience: Lessons in Multimethod Arms Control Verification and Risk Management

by

Brian S. Mandell
Norman Paterson School of
International Affairs
Carleton University

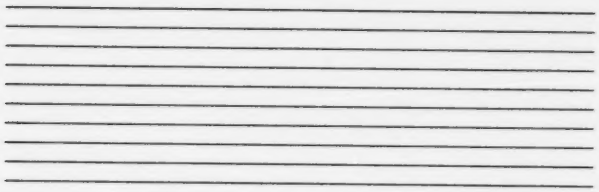
prepared for

The Arms Control and
Disarmament Division

Department of External Affairs
Ottawa, Ontario, Canada

Arms Control Verification Studies No. 3

87-06495/



Since 1947 Canada has taken an active role in a variety of peacekeeping and observer missions under United Nations auspices as well as in other contexts. This cumulative experience was applied effectively in the days following the 1973 October War. Though not as part of a concerted package, a variety of monitoring and observational techniques were applied to verify compliance with a number of agreements relating to the Sinai. Canadians served in UNEF II as a ground force in support of the United Nations operation. More recently Canada has agreed to provide helicopter support to the Multinational Force and Observers (MFO) which now operates in the Sinai. The cover design represents the application of space technology as well as airborne and ground systems for monitoring purposes in support of the maintenance of peace and security.

The graphic on the cover page represents the ongoing dialogue on arms control and disarmament issues in Canada and between Canadians and the world community.

Arms Control
Verification Studies

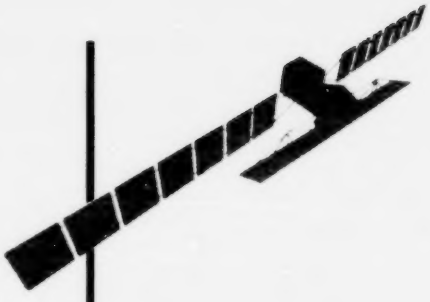
Arms Control Verification Studies are issued periodically by the Arms Control and Disarmament Division of the Department of External Affairs. Their purpose is to disseminate the results of independent research undertaken for the Department of External Affairs as part of ongoing work by the department in this area.

The views expressed in these reports are those of the authors and do not necessarily represent those of the Department of External Affairs or of the Government of Canada.

Vous trouverez un résumé en français de la présente étude à la page iii de ce document.

On peut se procurer une version française de cette étude en écrivant à l'adresse suivante :

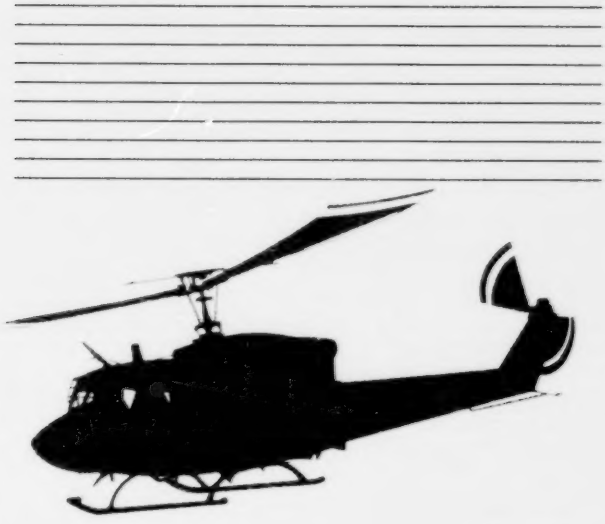
Direction du contrôle des armements et
du désarmement
Ministère des Affaires extérieures
Tour A, 6e étage
125, promenade Sussex
Ottawa (Ontario)
Canada
K1A 0G2



The Sinai Experience: Lessons in Multimethod Arms Control Verification and Risk Management

by

Brian S. Mandell
Norman Paterson School of
International Affairs
Carleton University



prepared for

The Arms Control and
Disarmament Division

Department of External Affairs
Ottawa, Ontario, Canada

©Department of External Affairs
September 1987
ISSN 0828-3664

Table of Contents

	Page
List of Acronyms	i
Abstract	ii
Résumé	iii
Preface	v
Introduction	1
PART I. Overview of the Sinai Experience	3
1. Negotiating Disengagement 1973-75: Educating the Parties in Incremental Risk-taking	3
2. The Sinai I Agreement: The First Phase in Institutionalizing Risk Reduction Measures, 1974-76	5
3. The Sinai II Agreement: Building Upon Precedent, 1975-79	6
a) Overview	6
b) The US Early Warning System	8
i) Components of the Ground Sensor System	9
ii) Efforts to Improve the Early Warning System	11
c) US Monitoring of the Egyptian-Israeli National Surveillance Stations	12
d) US Aerial Reconnaissance	13
e) Egyptian and Israeli National Means of Verification	13
f) The UN Contribution to the Verification System	14
g) The Compliance Record 1976-80	19
4. The Egypt-Israel Peace Treaty: Consolidating Past Achievements, 1979-82	19
a) Overview	19
b) New Sinai Field Mission Verification Responsibilities: On-Site Inspection and Aerial Patrols	21
c) The Compliance Record 1979-82	22
d) Phasing out of the SFM: April 1982	23
PART II. Multimethod Verification in the Sinai: Prerequisites and Lessons	24
1. Key Characteristics of the Sinai Verification Experience	24
a) Political-Military Factors	24
b) Geographic-Physical Factors	25
c) Technical-Operational Factors	25
2. Ten Lessons from the Sinai Experience for Arms Control Verification and Risk Management	27

PART III. Application of the Sinai Model Elsewhere 32
1. Potential Candidates for the Sinai Model 32
Case 1: Golan Heights 32
Case 2: West Bank — Jordan River Valley 34
Case 3: Israel-Lebanon 35
Case 4: Central Europe 36
a) Signal-to-Noise Ratio: Problems of Terrain and Traffic 37
b) The Problem of Defensible Borders 37
c) The Problem of Asymmetrical Constraints 38
d) Impediments to Identifying a Credible Third Party for Verification 38
e) Designing Effective Verification Procedures for Central Europe 39
f) The Geographic Setting: Fulda Gap/Intra-German Border 40
g) Extending the Concept of Limited-Forces Zones 40
h) Verification and Compliance 41
2. Other Potential Candidates for the Sinai Model 43
3. Potential Impediments to Applying the Sinai Model 43
4. Implications of the Sinai Experience for Canada 44
Conclusion 47
Bibliography 50

List of Figures

		Page
Map 1	Egyptian-Israeli Sinai Disengagement Agreement, January 18, 1974	4
Map 2	Second Egyptian-Israeli Sinai Disengagement Agreement and Early Warning Area, September 4, 1975	7
Map 3	Egypt-Israel Peace Treaty, March 26, 1979	20
Table 1	Evolution of the Multimethod Interlocking Verification System in the Sinai	15
Table 2	Canadian Armed Forces Participation in International Peacekeeping Forces and Observer Missions — 1947 Onwards	46

List of Acronyms

ABM	Anti-ballistic Missile
CSBM	Confidence- and Security-Building Measure
MBFR	Mutual and Balanced Force Reduction (Talks)
MFO	Multinational Force and Observers
MNF	Multinational Force
NATO	North Atlantic Treaty Organization
NSS	National Surveillance Station
NTM	National Technical Means
SDI	Strategic Defence Initiative
SFM	Sinai Field Mission
SSM	Sinai Support Mission
UN	United Nations
UNDOF	United Nations Disengagement and Observer Force
UNEF I	United Nations Emergency Force, 1956-67
UNEF II	United Nations Emergency Force, 1973-79
UNIFIL	United Nations Interim Force in Lebanon
UNTSO	United Nations Truce Supervision Organization
WTO	Warsaw Treaty Organization

Abstract

This study examines the application of a system of multimethod, interlocking verification procedures used for ensuring compliance with the Sinai I Agreement of 1974, the Sinai II Agreement of 1975, and the Egypt-Israel Peace Treaty of 1979. These methods included ground-based early warning systems, aerial and satellite reconnaissance, and on-site inspection undertaken by both third parties and the parties themselves. In addition to chronicling the process of Egyptian-Israeli disengagement of forces during the years 1973-82, the complex interrelationship between surveillance technology, peacekeeping and confidence-building is analyzed with a view toward identifying the prerequisites for the success of the Sinai model. A number of factors — political, military, geographic and technical — integrated in a unique manner were responsible for the success of the Sinai operation.

Guiding the case-study analysis are six propositions that seek to challenge some of the conventional wisdom regarding the prospects for regional arms control and verification:

- *Proposition 1*
  Arms control and verification regimes can be created and sustained in regions plagued by endemic violence.
- *Proposition 2*
  Third parties can facilitate the creation of arms control regimes as well as assist the parties in verifying new agreements.
- *Proposition 3*
  Effective verification measures can contribute significantly to risk management and confidence-building in disputes where there is little or no history of conflict management.
- *Proposition 4*
  Technology-intensive verification procedures can be integrated with more traditional kinds of peacekeeping operations in order to strengthen the compliance process.
- *Proposition 5*
  With appropriate modification, elements of the Sinai model can be applied to other regional conflict settings.
- *Proposition 6*
  Third parties, including countries like Canada, can make a significant contribution to the verification of regional arms control agreements.

The analysis of the Sinai case-study confirms, in varying degrees, all the propositions noted above. Three principal findings of the study are, however, especially noteworthy. First, verification can contribute significantly to risk management and confidence-building, and thus provide the necessary impetus for more far-reaching arms control and verification arrangements. In the immediate aftermath of hostilities, when confidence is virtually non-existent, the verification system serves an important risk reduction function by dampening incentives for surprise attack, providing adequate early warning and clarifying ambiguous activities.

Once the verification system has withstood the initial "litmus test" of intentions, thereby strengthening the position of those in power who opted for a policy of disengagement rather than confrontation, then compliance with the verified agreement will build confidence over time to the point where defection from the agreement is seen as politically and strategically counter-productive. The Sinai case strongly suggests the extent to which confidence emanating from the successful verification of a military agreement preceded, and ultimately advanced, political accommodation between the parties such that the signing of a peace treaty was possible. Moreover, the synergistic integration of individual verification components (i.e., unattended ground sensors, on-site inspections and aerial reconnaissance) clearly illustrated that procedures which worked well in the past could facilitate both the negotiation and implementation of a new verification regime. Hence, effective verification may lead to a positive "spill-over" effect.

A second important finding of the study suggests that the core elements of the Sinai model — a disengagement agreement composed of a

demilitarized buffer zone flanked by zones of limited forces, all verified by a system of multiple interconnecting verification techniques — could, appropriately modified for variations in mission, terrain and number of borders and parties, do much to stabilize numerous regional conflict settings. Should the political conditions for an agreement pertain, the most suitable candidates for the Sinai model include the Golan Heights; the Jordan River Valley/West Bank; the Israel-Lebanon border; and the Fulda Gap/Intra-German border area of Central Europe. In addition, there are other *prima facie* cases where the Sinai model may have some application, including various borders in Central America in the context of the Contadora process, Northern Ireland, Western Sahara, South Africa/Namibia, India/Pakistan and Iran/Iraq as part of a postwar settlement.

The third principal finding suggests that third parties, acting unilaterally or multilaterally, can play an important role in designing and implementing verification procedures that would complement national means of verification. Third parties may play different roles ranging from offering technical and industrial expertise to direct forms of monitoring such as participating in multilateral consultative arrangements. In the regional context, where the national technical means of the superpowers may be neither sufficient nor relevant to assure the viability of an agreement, third parties, including countries like Canada, may be able to exert greater influence with the local parties. A trend toward the multilateralization of the arms control process, especially at the regional level, may lead to the development of new international norms and procedures whereby parties to an agreement invite other countries to participate in monitoring agreements.

Résumé

La présente étude examine la façon dont a été appliqué le système de procédures pluralistes et complémentaires de vérification utilisé pour surveiller l'application de l'Accord Sinaï I de 1974, de l'Accord Sinaï II de 1975 et du Traité de paix israélo-égyptien de 1979. Ces méthodes mettaient en oeuvre des systèmes terrestres d'alerte avancée, des opérations de surveillance aérienne et spatiale ainsi que des inspections sur le terrain entreprises par des tierces parties et par les parties à l'accord elles-mêmes. La présente étude fait l'historique du processus de dégagement des forces israélo-égyptiennes entre 1973 et 1982, puis analyse les liens complexes qui unissent la technologie de la surveillance aux activités de maintien de la paix et de renforcement de la confiance en vue d'identifier les conditions préalables indispensables au succès du modèle du Sinaï. L'opération du Sinaï doit son succès à un certain nombre de facteurs politiques, militaires, géographiques et techniques agencés selon une formule unique.

L'étude de cas s'appuie sur les six propositions suivantes qui visent à remettre en question certaines opinions traditionnelles ayant trait aux perspectives du contrôle des armements et de la vérification à l'échelle régionale:

- *Première proposition:*
  Il est possible de mettre en place et de maintenir des régimes de contrôle des armements et de vérification dans les régions où la violence est endémique.
- *Deuxième proposition:*
  Les tierces parties peuvent faciliter l'instauration des régimes de contrôle des armements et aider les parties à vérifier le respect des nouveaux accords.
- *Troisième proposition:*
  Des mesures de vérification efficaces peuvent améliorer considérablement la gestion des risque et le renforcement de la confiance dans le cas des différends pour lesquels les efforts de gestion de conflit ont toujours été nuls ou très minimes.

- *Quatrième proposition:*
  Il est possible d'intégrer les procédures de vérification faisant largement appel aux moyens techniques aux opérations plus conventionnelles de maintien de la paix, afin de renforcer le processus de conformité.
- *Cinquième proposition:*
  Les éléments du modèle du Sinaï peuvent, après les modifications qui s'imposent, s'appliquer à d'autres situations conflictuelles.
- *Sixième proposition:*
  Des tierces parties, y compris des pays comme le Canada, peuvent jouer un rôle important dans la vérification des accords régionaux de contrôle des armements.

L'analyse du cas du Sinaï confirme, à divers degrés, toutes les propositions énoncées ci-dessus. Trois des principales conclusions de la présente étude sont tout particulièrement dignes d'intérêt. Premièrement, la vérification peut faciliter considérablement la gestion des risques et l'instauration de la confiance et donner ainsi l'élan nécessaire à des dispositions plus vastes de contrôle des armements et de vérification. Au lendemain d'un conflit, lorsque la confiance est quasiment inexistante, le système de vérification joue un rôle important de réduction des risques en modérant les vélléités d'attaques surprises, en offrant un système approprié d'alerte avancée et en clarifiant les activités ambiguës.

Une fois que le système de vérification a passé avec succès la première épreuve des intentions, renforçant ainsi la position des dirigeants qui avaient opté pour une politique de dégagement plutôt que de confrontation, le respect de l'accord contribue à renforcer peu à peu la confiance au point que toute défection aurait un effet négatif tant sur le plan politique que sur le plan stratégique. L'exemple du Sinaï démontre clairement que la confiance instaurée grâce à la vérification fructueuse d'un accord militaire a précédé et finalement encouragé une entente politique entre les parties, au point que la signature d'un traité de paix est devenue possible. En outre, l'intégration synergique des différents éléments de vérification (sous la forme de détecteurs terrestres télésurveillés, complétés par des inspections sur le terrain et des inspections aériennes) prouve clairement que les méthodes qui ont bien fonctionné par le passé pourraient faciliter à la fois la négociation et la mise en oeuvre d'un nouveau régime de vérification. Il s'avère donc qu'une vérification efficace peut avoir des retombées positives.

Selon une deuxième conclusion importante de l'étude, les composantes centrales du modèle du Sinaï — en l'occurrence un accord de dégagement proposant une zone tampon démilitarisée flanquée de deux zones à armements limités, toutes soumises à un système mettant en oeuvre plusieurs techniques de vérification reliées entre elles —, pourraient, une fois modifées en conséquence pour tenir compte des variantes propres à la mission, à la topographie et au nombre de frontières et de parties, améliorer de beaucoup la stabilité dans de nombreux contextes conflictuels régionaux. Si l'on pouvait réunir les conditions politiques nécessaires à la signature d'un accord, les sites les plus probables pour l'application du modèle du Sinaï seraient les suivants: les hauteurs du Golan; la vallée du Jourdain et Cisjordanie; la frontière entre Israël et le Liban; ainsi que la trouée de Fulda et la frontière entre les deux Allemagnes, en Europe centrale. D'autre part, les situations suivantes se prêteraient, de prime abord, à l'application du modèle du Sinaï: diverses zones frontalières d'Amérique centrale dans le contexte du processus de Contadora, l'Irlande du Nord, le Sahara occidental, l'Afrique du Sud et la Namibie, l'Inde et le Pakistan, ainsi que l'Iran et l'Iraq, dans le cadre d'un accord de cessez-le-feu.

La troisième principale conclusion révèle que l'intervention unilatérale ou multilatérale de tierces parties peut jouer un rôle important dans la

mise au point et la mise en oeuvre des procédures de vérification qui serviraient de complément aux moyens nationaux de vérification. Les tierces parties peuvent jouer, dans le processus de vérification, des rôles différents allant de la prestation de compétences techniques et industrielles à des formes diverses de surveillance, y compris la participation à des ententes multilatérales de consultation. Dans certains contextes régionaux où les moyens techniques nationaux des superpuissances ne seraient ni suffisants ni appropriés pour assurer la viabilité d'un accord, des tierces parties comme le Canada pourraient exercer une influence plus grande auprès des parties locales. La multilatéralisation du processus de contrôle des armements et des systèmes de vérification, en particulier au niveau régional, mènera peut-être à l'élaboration de nouvelles normes et procédures internationales en vertu desquelles les parties à un accord pourront demander expressément à d'autres États de participer à la surveillance des accords.

Preface

When the idea for this work first developed, it was in the belief that there was a significant gap in the arms control literature on those initiatives where innovative verification techniques and the contribution of third parties significantly enhanced the prospects for success. It remains my hope that by highlighting the success of the Sinai experience — in contrast to the deadlocks, stalemates and recurring problems associated with so many other arms control efforts — the impetus can be found to develop similar innovative approaches to security for other regional conflicts. If this study sparks greater interest in how Canada and other like-minded countries can contribute more effectively to verification and, by extension, to the reduction of regional tensions, it will have served its purpose.

I am indebted to my former colleagues at the departments of National Defence and External Affairs who are responsible for my interest in the intricacies of verification. I would like to express my deep gratitude to Ron Cleminson and Gordon Vachon of the Department of External Affairs who took precious time to read the study and make valuable comments. I am especially indebted to Alan Crawford and Fen Hampson for their endless encouragement and assistance in formulating and refining the propositions that provide the focus for this study.

Introduction

Much of the recent debate surrounding the prospects for arms control has focussed on the intricacies of US-Soviet negotiations at Geneva. Certainly, the outcome of these bilateral negotiations will have profound implications for the future of international peace and security. Unfortunately, growing concerns over SDI, the potential demise of the ABM Treaty and the continuing crisis in superpower compliance diplomacy have all tended to overshadow the need for more effective and durable security arrangements at the regional level — especially in those conflict-prone areas where a sudden escalation of armed conflict between local adversaries could invite direct military intervention by the United States and the Soviet Union.

Given that certain regional conflicts, if left uncontrolled, could jeopardize international security, how do we explain the lack of attention to regional arms control in general and to the political and technical requirements for regional verification systems in particular? First, new arrangements for regional security have often been considered only as an after-thought in the wake of a crisis that has directly or indirectly threatened the strategic and economic interests of the great powers. Solutions to such crises have tended to be reactive and *ad hoc*, involving fact-finding missions and peacekeeping interventions, with little thought given to the requirements of longer-term stability. Second, some regional specialists argue that the prospects for any arms control agreements, and their attendant verification arrangements, in regions of endemic violence are severely circumscribed by the absence of conflict management experience among the parties and the inability of local adversaries to develop even the minimum level of political accommodation so vital for initiating a new security relationship.

Finally, it is often suggested that even if local parties could develop sufficient political will and self-help and could define an appropriate strategic context within which to establish an arms control regime, they may still lack the technical and organizational expertise necessary for verifying compliance with the provisions of any new agreement. It may only be with the assistance of third parties capable of facilitating the negotiation of an arms control regime and subsequently assisting the parties in verifying their agreement, that success would be possible.

This study seeks to challenge some of the prevailing assumptions regarding the prospects for regional arms control and verification by examining one case — the Sinai experience of 1973-82 — where an innovative approach to an apparently intractable security problem did lead to greater stability, confidence and subsequent agreements between the parties. Guiding the analysis are six propositions that serve to draw out the lessons of the Sinai experience and its potential relevance to other conflict settings. These propositions are as follows:

- *Proposition 1*
  Arms control and verification regimes can be created and sustained in regions plagued by endemic violence.
- *Proposition 2*
  Third parties can facilitate the creation of arms control regimes as well as assist the parties in verifying new agreements.
- *Proposition 3*
  Effective verification measures can contribute significantly to risk management and confidence-building in disputes where there is little or no history of conflict management.
- *Proposition 4*
  Technology-intensive verification procedures can be integrated with more traditional kinds of peacekeeping operations in order to strengthen the compliance process.

- *Proposition 5*
  With appropriate modification, elements of the Sinai model can be applied to other regional conflict settings.
- *Proposition 6*
  Third parties, including countries like Canada, can make a significant contribution to the verification of regional arms control agreements.

Part I of this study provides an overview of the Sinai experience from 1973 to 1982. Special emphasis is placed on the multimethod and interlocking nature of the verification system utilized for monitoring compliance with the Sinai I and Sinai II Disengagement Agreements and the Egypt-Israel Peace Treaty of 1979. Part II examines the political-military, geographical and technical factors that made up the prerequisites for success in the Sinai case and offers some lessons for arms control verification and risk management. In Part III, the application of the Sinai model to other conflict settings as well as the potential impediments to implementation are discussed. The paper concludes with a review of the propositions offered in the introduction.

Part I

Overview of the Sinai Experience

1. Negotiating Disengagement 1973-75: Educating the Parties in Incremental Risk-taking

Even before becoming Secretary of State in 1973, Henry Kissinger was critical of previous American approaches designed to bring about a comprehensive solution to the long-standing Arab-Israeli conflict. Aware of the diplomatic momentum that could be developed if the parties were to offer tactical concessions on the marginal issues of mutual interest to both sides, Kissinger opted for an incremental approach that would give the disputants time to work out common interests and differences gradually as negotiations proceeded.

In Kissinger's view, step-by-step negotiations would allow the Arab states and Israel to see some progress at an early date. This, in turn, would educate the parties with respect to the rewards of self-restraint and the utility of concessions.[1] The 1973 October War provided Kissinger with the opportunity to put his theory to the test and to create the conditions necessary for peacemaking. The postwar cease-fire and its subsequent codification in the Six-Point Agreement signed by Egypt and Israel on November 11, 1973, demonstrated the parties' intent to end the state of hostilities and to reverse those policies that, heretofore, had sustained the conflict. As the first step in the confidence-building process, the cease-fire served to stabilize the military relationship between the two belligerents. Most notably, it served to maintain a stalemated military situation in which efforts to mediate the conflict and to establish non-belligerent contacts could begin.

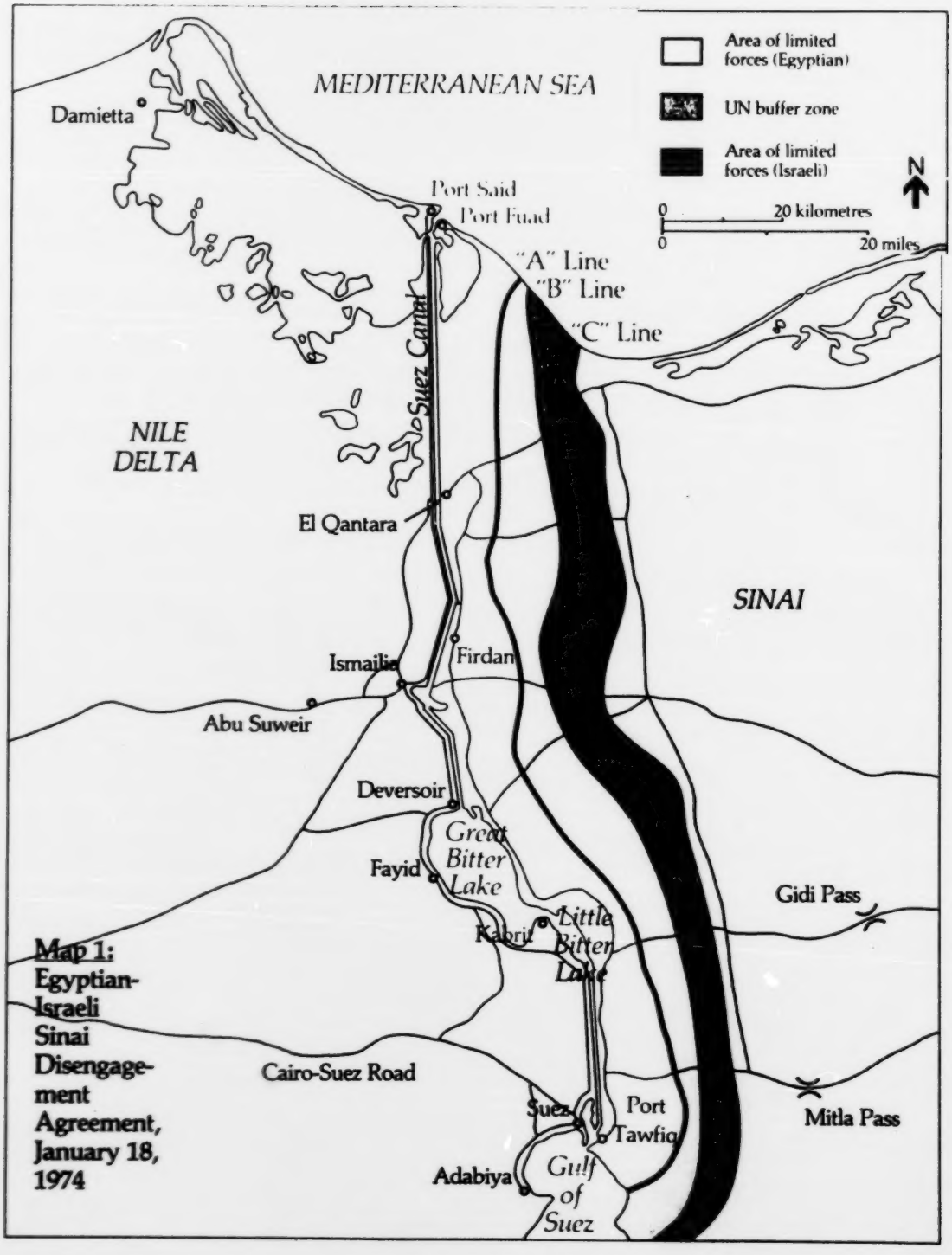
To further ensure the stability of the immediate postwar situation, the newly formed United Nations Emergency Force (UNEF II) was called upon to perform a number of peacekeeping and verification functions including (1) preventing further entanglement of the Egyptian and Israeli forces; (2) assuming control of and establishing checkpoints along the Cairo-Suez Road; (3) working with the Israelis to verify the non-military nature of cargo supplied to the encircled Egyptian Third Army; and (4) having the UNEF commander serve as the chairman of the "Kilometre 101" Egyptian-Israeli military disengagement negotiations.[2]

The "Kilometre 101" negotiations were as important in form as they were in substance. Professional Egyptian and Israeli military officers — meeting face-to-face for the first time in 25 years — began to negotiate specific details regarding the separation of forces. That these talks occurred at all, was evidence of Kissinger's skill in persuading President Sadat to subsume his demand for a return to the October 22 cease-fire lines and to seek instead a broader Israeli withdrawal of forces as part of a disengagement agreement. To merely remove Israel from the west bank of the Suez Canal, Kissinger argued, would accomplish very little. The important thing was to produce a more substantial Israeli withdrawal into the Sinai that both sides would perceive as the beginning of an ongoing process.[3]

[1] Henry Kissinger, *Years of Upheaval* (Boston: Little, Brown, 1982), p. 636.

[2] Michael Comay, "UN Peacekeeping in the Israel-Arab Conflict, 1948-1975: An Israeli Critique", *Jerusalem Papers on Peace Problems*, No. 17-18 (1976) p. 33.

[3] Henry Kissinger, *Years of Upheaval*, p. 639.



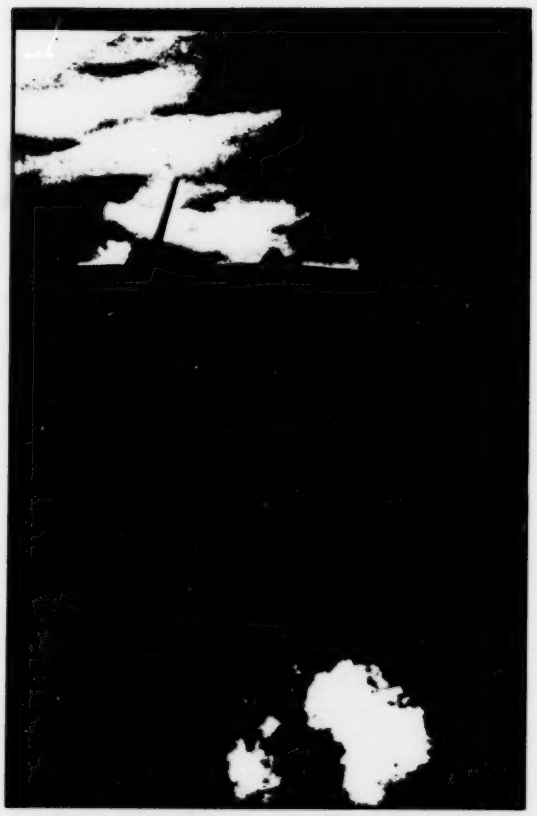
Map 1: Egyptian-Israeli Sinai Disengagement Agreement, January 18, 1974

2. The Sinai I Agreement: The First Phase in Institutionalizing Risk Reduction Measures, 1974-76

After a week of intensive "shuttle diplomacy" by Secretary Kissinger, Egypt and Israel reached a preliminary interim accord, the Sinai I Agreement of January 18, 1974, in which a number of measures to reduce the possibility of inadvertent war were institutionalized.[4] The measures adopted in the Agreement reflected the principal concern of the protagonists: the need to reduce the opportunities for surprise attack and to increase the amount of warning time. These measures were consistent with the realities of a conflict in which neither side could be expected to relinquish any perceived or actual strategic advantage.

Among the measures agreed, both sides accepted the idea that forces in the Sinai would be separated by a demilitarized buffer zone controlled by UN personnel. Furthermore, they agreed to adhere to the concept of limited force zones that incorporated specified restrictions on armed forces and weapons. The level of firepower permitted each party in these zones was not to be capable of reaching the lines of the other party. To ensure compliance with the Agreement, the limited forces zones were to be inspected by the UNEF, to which Israeli and Egyptian liaison officers would be attached. In addition, the deployment of forces would be monitored regularly by American reconnaissance aircraft. Finally, in an effort to create some relationship between confidence-building at the military level and progress at the political level, Egypt and Israel agreed that disengagement would occur as a process of phased withdrawal in which the parties would gradually establish a new set of ground rules to guide future military behaviour and subsequent negotiations.[5]

In the aftermath of the first Egyptian-Israeli Sinai Disengagement Agreement of January 1974, Secretary Kissinger undertook a second initiative in March 1975 to extend the disen-



Δ Early versions of this Lockheed SR-71 "Blackbird" reconnaissance aircraft were in service with the US Air Force by the mid-1960s. One SR-71 reportedly operated in the Middle East during and after the October War of 1973. Aircraft such as these may have been used by the US to provide aerial photography to Israel and Egypt during the Sinai Disengagement Agreements and the Egypt-Israel Peace Treaty. (Photo courtesy of US Department of Defense).

[4] For the full text of the Sinai I Agreement of January 18, 1974 see Kissinger, *Years of Upheaval*, pp. 1250-1251.

[5] William Quandt, *Decade of Decisions* (Berkeley: University of California Press, 1977), pp. 208-209.

gagement process. Unfortunately, neither Egypt nor Israel felt compelled at this juncture to offer the more extensive concessions necessary to produce an agreement. For its part, Egypt demanded that Israel withdraw to a line east of the crucial Mitla and Gidi passes and agree to return the oil fields at Abu Rudeis. Israel, however, fully aware of the strategic importance of the passes, insisted on maintaining its long-established electronic surveillance station at Gidi and refused to accept the Egyptian demand regarding the oil fields. To emphasize Israel's concern over losing strategic depth, Defence Minister Shimon Peres argued:

> It is a question not just of the Passes but of our military [intelligence] installations that have no offensive purpose and are necessary. The previous Government could not overcome the psychological blow that the Syrians and the Egyptians launched a surprise attack. We need an early warning system. We need 12 hours of warning. Under the proposed agreement we'd have only six.[6]

In addition to keeping its early warning station, the Israeli leadership sought a formal Egyptian declaration of non-belligerency, one that would effectively remove Egypt from the Arab war coalition.

The deadlock between the two belligerents was ultimately broken on March 25, 1975, when President Sadat announced that Egypt would reopen the Suez Canal and approve a three-month extension of the UNEF mandate beyond its April 1975 expiry date. These significant political gestures permitted negotiations to resume. Capitalizing on these developments, Secretary Kissinger engaged in another round of "shuttle diplomacy" aimed at achieving a more extensive disengagement of forces in the Sinai.

3. The Sinai II Agreement: Building Upon Precedent, 1975-79

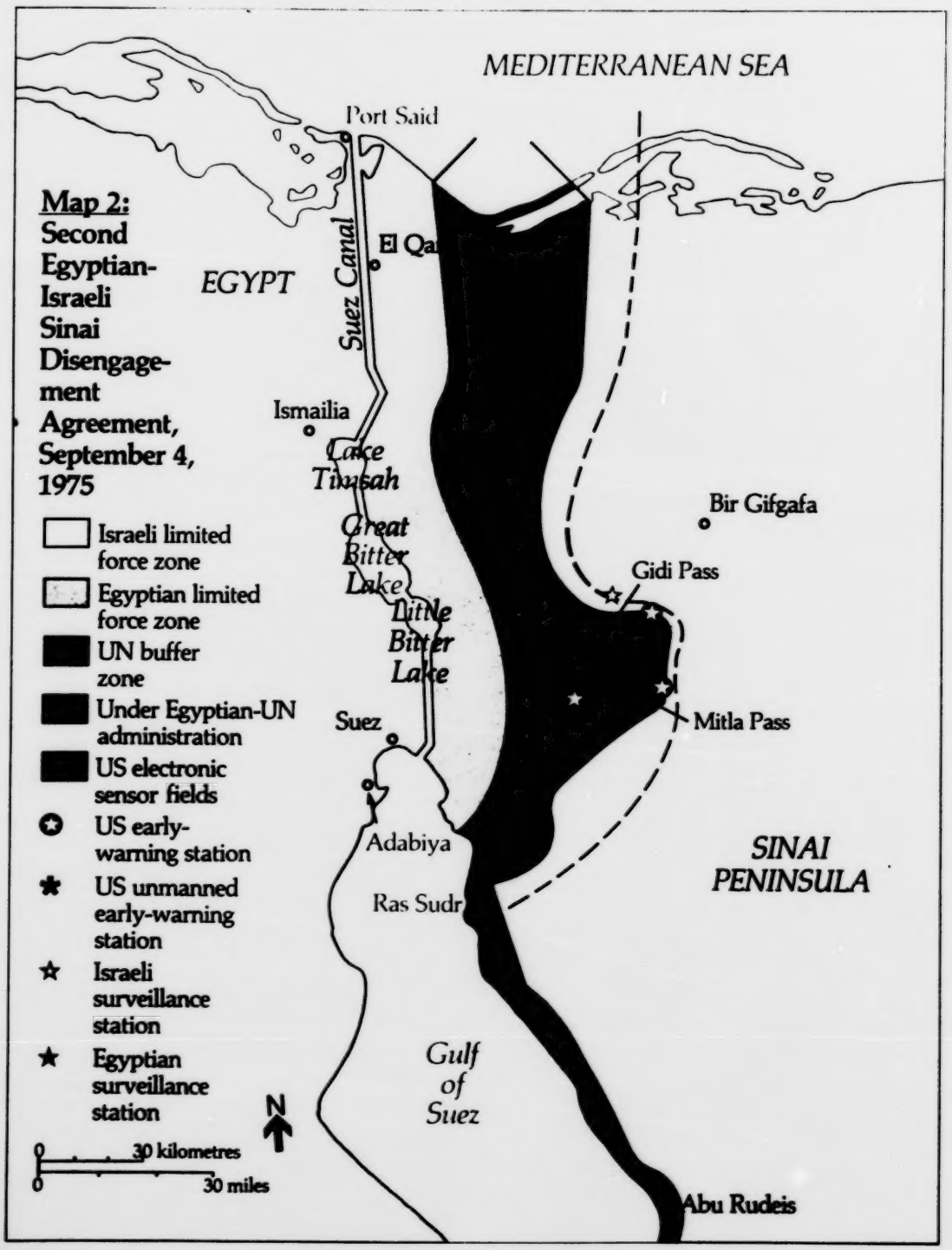
3(a) *Overview*

Having already accepted the idea of a demilitarized buffer zone controlled by the UNEF with adjacent limited force zones monitored by the UNEF, the parties offered no objections to implementing an extended version of these measures as part of a second disengagement agreement. Israel agreed to withdraw from the Mitla and Gidi passes, which would be included in the new UN buffer zone, and to quit the oil fields at Abu Rudeis. Still highly suspicious of the Egyptians, however, and remembering well the sudden withdrawal of the UNEF in 1967, Israel balked at the idea of foregoing its strategic surveillance station at the western end of the Gidi Pass.

This problem was resolved when the parties agreed that Egypt would be permitted to build and maintain a surveillance station similar to Israel's at the eastern end of the Gidi Pass. In addition, at the request of both Egypt and Israel, the United States agreed to become directly involved in the implementation of the Agreement, including its verification. This US decision to participate provided both parties with sufficient confidence to sign the Sinai II Agreement on September 4, 1975.[7] Each believed the series of interlocking verification measures — UN monitoring of compliance with agreed force levels and monitoring of access to the passes by the parties themselves as well as by the US — would provide a level of confidence commensurate with their security concerns. In short, both parties believed the Agreement was structured such that neither side

[6] Nadar Safran, *Israel: The Embattled Ally* (Cambridge MA: Harvard University Press, 1978), p. 546.

[7] For the full text of the Sinai II Agreement of September 4, 1975 see United States Sinai Support Mission, *Report to the Congress* (Washington, D.C.: Department of State, 1982), Annex A.


MEDITERRANEAN SEA
Port Said
EGYPT
Suez Canal
El Qa
Ismailia
Lake Timsah
Great Bitter Lake
Little Bitter Lake
Suez
Adabiya
Ras Sudr
Gulf of Suez
Bir Gifgafa
Gidi Pass
Mitla Pass
SINAI PENINSULA
Abu Rudeis
Map 2: Second Egyptian-Israeli Sinai Disengagement Agreement, September 4, 1975
Israeli limited force zone
Egyptian limited force zone
UN buffer zone
Under Egyptian-UN administration
US electronic sensor fields
US early-warning station
US unmanned early-warning station
Israeli surveillance station
Egyptian surveillance station
N
30 kilometres
30 miles

would be better off — or at least not worse off — by adhering to its terms.

In accordance with the terms of the Annex to the Sinai II Agreement, the United States was entrusted with three critical verification missions:

- monitoring the Mitla and Gidi Pass areas of the Sinai buffer zone;
- monitoring the operations of the Egyptian and Israeli surveillance stations; and
- undertaking aerial reconnaissance missions over the areas covered by the Agreement.

In addition to these three explicit undertakings, it is likely that the US monitored compliance by the parties using its own national technical means (NTM), including satellite systems.[8]

3(b) *The US Early Warning System*

The American agreement to operate a ground-based early warning system in the strategic Mitla and Gidi passes on behalf of Egypt and Israel represented an innovative approach to a highly sensitive security problem. Established by presidential directive on November 14, 1975, the US Sinai Support Mission (SSM) was charged with the responsibility of providing Egypt, Israel and the UN with tactical early warning of any unauthorized movement of armed forces (other than those of the UN) into the passes or any preparation for such movement.[9] Situated in the State Department in Washington, the SSM was managed (until its closing in September 1982) by a director serving as special representative to the President. Supporting the director in his duties were senior representatives of the State Department, the Department of Defense, the Agency for International Development, the Arms Control and Disarmament Agency and the Central Intelligence Agency, all of whom served as members of the Sinai Interagency Board.

The initial task of the SSM was to establish the Sinai Field Mission (SFM) that would be responsible for operating watch stations, sensor fields, a supporting base camp, and a communications network. In order to ensure the completion of this task before February 22, 1976, the date on which the phased turnover of Sinai territory to the UN by Israel would be completed, the SSM asked relevant companies in the private sector to submit contract proposals. E-Systems Inc., a Texas-based company engaged in producing a variety of electronic systems, was awarded the contract. First priorities for E-Systems included installation of the sensor and communication equipment, both of which

[8] Stansfield Turner, "Opening the World's Skies for Mankind", *Space Policy* (November 1985), p. 358. Turner notes: "For over ten years following the 1967 Arab-Israeli War, we (the US) provided special intelligence services to Egypt and Israel in the form of aerial photographs taken monthly of the Sinai desert". It may be assumed that during this same period (and beyond) the US undertook space surveillance to verify compliance with the Sinai I and Sinai II Agreements and the Peace Treaty. What is not clear is whether the data from the space surveillance was transmitted to the parties.

[9] United States Sinai Support Mission, *Watch in the Sinai* (Washington, D.C.: Department of State, 1980), p. 6.

were essential for the performance of verification functions. Initial construction, engineering and US government costs amounted to $25 million (US).[10]

To perform its early warning detection, identification and reporting functions,[11] the United States established three watch stations staffed exclusively with civilian personnel and four unmanned sensor fields equipped with line, point, and imaging sensors to scan the entrances to the passes, fixing positions and determining the size, speed, nature and direction of intruders. The sensors used in the passes were placed in strings several thousand metres long on the roads and trails leading through and across the passes.

i) *Components of the Ground Sensor System*

The following five automatic sensors, involving numerous detection capabilities, were used in the Sinai. These sensors incorporated the detection principles of seismic, acoustic, infra-red, magnetic, electromagnetic, pressure, electric and earth strain disturbances.[12]

SSCS — *The Strain Sensitive Cable Sensor* was a miniature coaxial cable of several hundred metres in length. Buried in the ground, it served as an invisible electromagnetic fence that registered the movement of people or vehicles across it.

PIRCS — *The Passive Infra-red Confirming Scanner* detected intrusions into the area it scanned. The infra-red picture produced by the scanner allowed operators to distinguish between people and vehicles, to count numbers and to specify direction and speed.

MINISID III — *Miniature Seismic Intrusion Detectors* were used to detect earth vibrations produced by moving personnel or vehicles. This system could, in the sandy soil of the Sinai, detect a vehicle at 500 metres and a person at 50 metres. Tamper-proof and battery-operated, the detection devices were positioned just underneath the surface, close to the entrance of the passes.

[10] United States Sinai Support Mission, *Report to the Congress* (Washington, D.C.: Department of State, April 13, 1976), p. 35.

[11] The term "early warning system" and "verification system" are used in this paper somewhat differently than used by the parties to the Sinai Agreements and by other analysts. (For somewhat different views of this terminology see *Watch in The Sinai* (see note 9), and D. Barton, "The Sinai Peacekeeping Experience: A Verification Paradigm for Europe", In *SIPRI Yearbook, 1985* (London: Taylor and Francis, 1985), pp. 541-564.) This paper takes the view that any technical information gathering system such as a ground-based monitoring system (or the "early warning system" as it was termed by the parties) or aerial photo-reconnaissance form components of a verification system as long as the information gathered is used to assess compliance with commitments under an agreement. Similarly, on-site inspection and control posts form elements of a verification system. It is important to note that the components of the verification system in the Sinai Agreements changed over time as did the duties assigned to particular countries and organizations respecting these components.

[12] United States Sinai Support Mission, *Watch in the Sinai*, p. 25. See also David Barton, "The Sinai Peacekeeping Experience", pp. 546-547.

AAU Used in conjunction with MINISID III, the *Acoustic Add-on Units* were auxiliary devices that detected and transmitted sounds within the sensor field back to the watch station.

Once the MINISID detected intrusions, the AAU was triggered with the resulting acoustic information transmitted to the watch station operator for identification. The type of intruder could be deduced from its sound pattern.

DIRID *Directional Infra-red Intrusion Detectors* were employed to sense temperature differences between an intruder and the background. As a passive optical device, with two fields of view, DIRID were capable of confirming an intruding presence and reading the direction of movement.

Each sensor field, consisting of the sensor types described above, relayed data to a watch station where radio frequency transmissions from individual sensors were automatically received, decoded and displayed on a chart recorder. The order and rate of the activations along the sensor strings were monitored by an operator. By following the progress of an intruder through the sensor field, the observer could determine the location of the intrusion, the direction and speed of travel, the number of objects, and their approximate size. Final identification of the intruder was made in the watch station using visual aids. During daylight hours, observers used powerful wide-angle Zeiss 15 × 60 prism binoculars to confirm authorized movements or to identify the exact nature of unauthorized objects or movements.[13] For night operations, observers used terrestrial telescopes with high-powered wide-angle image intensifiers. These devices permitted watch station observers a range of 20 km during the day and 5 km at night.[14] At Gidi West, however, where the sensor field was only covered by an unmanned watch station, a remotely controlled imaging infra-red sensor was used to produce images similar to a television picture.

While sensor surveillance proved capable of producing timely information regarding the nature of intrusions, there were conditions under which the ability of the SFM to identify activity in the sensor fields deteriorated. In particular, conditions of poor visibility created by dust or ground fog often precluded optimum use of the optical and electro-optical equipment.[15]

[13] David Barton, "The Sinai Peacekeeping Experience", p. 547.

[14] *Ibid.*

[15] In order to overcome this problem, SFM technicians began working with thermal imaging devices. Similar to FLIR (forward-looking infra-red system), these devices detect infra-red energy emitted by objects within the field of view and are insensitive to visible light. Since thermal devices receive the longer wave length infra-red energy, dust and fog are less of a problem than for visible light equipment. See United States Sinai Support Mission, *Report to the Congress*, April 13, 1978, p. 12.

ii) *Efforts to Improve the Early Warning System*

During the course of operations, SFM staff searched for ways to reduce the manpower required to operate the early warning system without sacrificing efficiency and effectiveness. A number of alternatives for substituting personnel with additional advanced technology were considered. These included centralized detection and identification patrols, centralized detection and identification by remote imaging devices, substituting radar for the unattended groups of sensors, and centralized radar detection and remote imaging.[16] From a technical point of view, all of these options were attractive. A large reduction in manpower, however, did not fit with the political importance of ensuring credibility for the American promise to guarantee the agreement. The requirement to sustain this political symbolism precluded using technical measures that could have substantially reduced manpower.

In order to improve the system's technical efficiency while preserving its political-symbolic mission, a centralized detection system was eventually installed with the identification function left to the SFM, without any subsequent reduction in personnel. Prior to these improvements, introduced on March 1, 1978, sensor activations had been received on "strip charts" that watch station personnel would analyze to determine the nature of the intrusion. These findings were then relayed from the watch stations to the operations centre at SFM Headquarters. With the new centralized detection system, signals were relayed directly from the sensor fields to the operations centre at SFM Headquarters where all activations were instantaneously displayed on a small-scale map of the early warning area. Once the sensor activation lit up small bulbs on the map, the personnel on duty could instantly see the location of an intrusion and, by observing the number of sensors that had been activated in a line perpendicular to the road, determine the nature of the object in question.[17] This centralized detection

[16] Alternatives involving advanced technology and procedures considered by the SFM as substitutes for personnel included:

1. *Centralized detection and identification patrols*:
   - Removal of all personnel from watch stations and a centralized facility is established for monitoring alarms transmitted by unattended ground sensors whenever an intrusion occurs. Identification is done by jeep or airborne patrol.
2. *Centralized detection and identification by remote imaging devices*:
   - All personnel removed from watch station.
   - Both the detection and identification functions are performed from a centralized facility.
   - All unattended ground sensor alarms are transmitted to this centralized facility where watch personnel immediately analyze them to determine whether an intrusion has occurred and operate remotely controlled day and night television cameras overlooking the sensor fields.
   - The pictures are transmitted back to the centralized facility where the camera operator identifies the intruder.
3. *Substitution of radar for the unattended ground sensors*:
   - Unattended ground sensors are replaced with ground surveillance radars.
   - Each of these radar devices can cover a much larger area than an unattended ground sensor and can improve the performance of the system by providing better identification under adverse climatic conditions.
   - When an intrusion occurs the radar transmits an alarm to the watch station where watch-station personnel identify the intruder.
4. *Centralized radar detection and remote imaging*:
   - A combination of numbers 2 and 3.
   - Unattended ground sensors are replaced by ground surveillance radars and television cameras with both day and night capability are used for identification of intrusions.
   - Both radar activations and video signals are transmitted directly to a centralized monitoring facility.

Cited in United States Sinai Support Mission, *Report to the Congress*, April 13, 1977, pp. 9-13.

[17] United States Sinai Support Mission, *Report to the Congress*, April 13, 1978, pp. 10-11.

greatly improved the timeliness, accuracy and completeness of the early warning detection process.

The early warning system was further enhanced on June 20, 1978, with the installation of a remotely controlled day and night television camera overlooking the Gidi West sensor field. Prior to the camera's installation, this field could not be seen from either the watch station or SFM Headquarters, thus creating a significant delay before objects passing through the field could be identified. The use of remote imaging, however, allowed a camera operator at Gidi East — some 22.5 km away — to identify an object shortly after it first entered the Gidi West sensor field. The sounding of a sensor alarm alerted the operator who then focussed the camera on the activated sensor and observed any activity on a TV monitor. Remote imaging, then, provided an observation capability nearly as good as the visual capability of the manned watch stations associated with the other three sensor fields.[18]

Beyond working to improve detection and identification functions on the ground, the field staff sought to improve the detection and identification of aircraft flying over the early warning area. Originally conceived as observation posts from which only ground activity was to be monitored, the three watch stations were not well suited to observing aircraft, which could approach the watch stations from any angle and pass over them undetected.[19] To remedy this "blind spot", observation booths with optical and electro-optical equipment were positioned on top of each watch station.

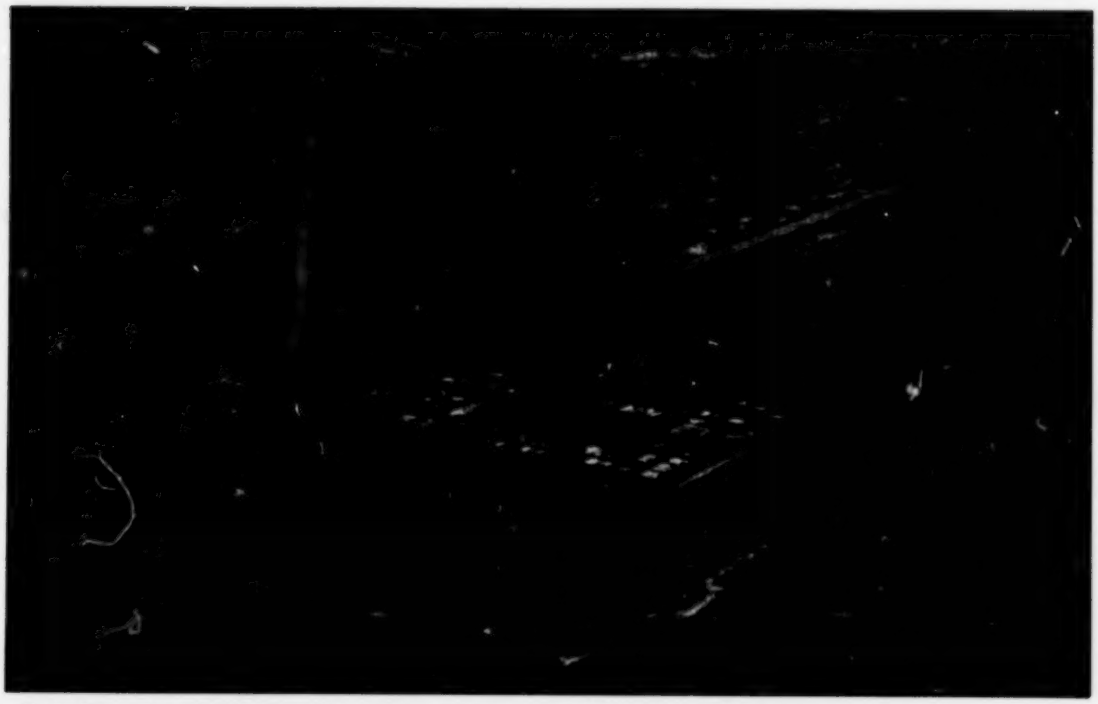
3(c) *US Monitoring of the Egyptian-Israeli National Surveillance Stations*

In accordance with the terms of the Sinai II Agreement, Egypt and Israel were each allowed to operate one national surveillance station (at each end of the Gidi Pass) whose functions were to be limited to visual and electronic surveillance. Each station, staffed by no more than 250 personnel, was prohibited from housing offensive weapons, though small arms were permitted. SFM civilian liaison officers were charged with the responsibility of verifying the procedures at each surveillance station. Present at both stations at all times, a US civilian liaison officer performed the monitoring duties from a small building overlooking and adjacent to the entrance gate of the assigned station. Equipped with a primary VHF communications system, the liaison officer was assured of instant access to the SFM Headquarters and was also able to facilitate communication between SFM Headquarters and the two national stations.[20] Concerned with maintaining credibility, US personnel sought to execute their role in a strictly even-handed manner by ensuring that identical verification procedures were used at each station.

[18] *Ibid.*, p. 7.

[19] *Ibid.*, p. 12.

[20] United States Sinai Support Mission, *Report to the Congress*, April 13, 1976, p. 26.



△ Similar to the earlier U-2R strategic reconnaissance aircraft, though slightly larger, the Lockheed TR-1 tactical reconnaissance aircraft is basically a powered sailplane. The TR-1 went into service with the US Air Force in 1981. Aircraft such as these may have been used by the US to provide aerial photography to Israel and Egypt during the Sinai Disengagement Agreements and the Egypt-Israel Peace Treaty. (Photo courtesy of US Department of Defense).

3(d) *US Aerial Reconnaissance*

In accordance with the Sinai II Agreement, the US carried out aerial reconnaissance missions, one every seven to ten days, or whenever it received a special request from Egypt, Israel or the UNEF. Surveillance missions were undertaken over the buffer zone and limited armaments and forces zones with mission results made available to the parties.[21]

3(e) *Egyptian and Israeli National Means of Verification*

There were two major components to the adversaries' national means of verification: the national surveillance stations (NSS) located in the Sinai and aerial surveillance. Not much information is openly available concerning the operations of the NSS (see discussion above). Beyond operating their respective surveillance stations, Egypt and Israel were also permitted to fly reconnaissance aircraft freely to the border of the buffer zone and to fly up to the middle line of the buffer zone on a schedule agreeable to both sides.

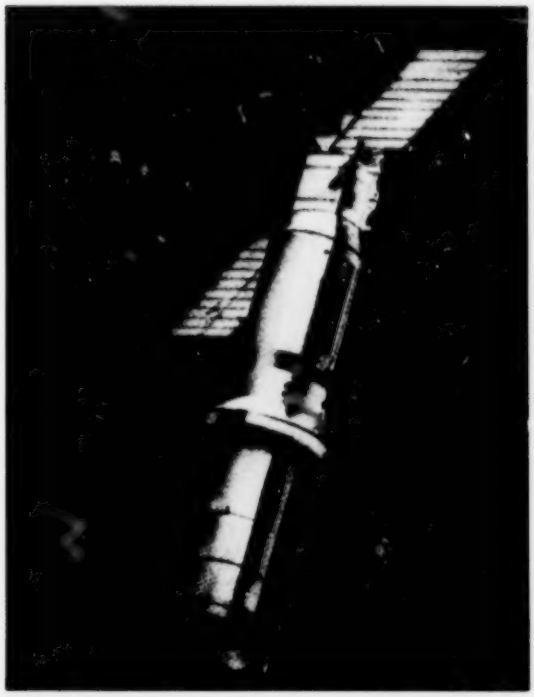
[21] See Table I for details of US aerial reconnaissance responsibilities under the Sinai II Agreement.

3(f) *The UN Contribution to the Verification System*

The US-manned early warning system, the two national surveillance stations and the reconnaissance overflights constituted three important mechanisms for verifying Egyptian and Israeli compliance with the Sinai II Agreement. The UNEF, an additional element in the multimethod system, also played a central confidence-building and verification role. Within the buffer zone, UNEF officials manned all checkpoints and observation posts, controlled all access to the zone and provided UN escorts for all Egyptian, Israeli and SFM personnel travelling to and from destinations within the zone. They also conducted inspections in the limited forces and armaments zones.[22]

Though each of the contributors to the overall verification system had its own specific mandate, many of the US, Egyptian, Israeli and UN activities were of an interlocking nature. For example, UNEF personnel were required to notify the SFM watch officer of all authorized movement through the passes. The watch officer, in turn, alerted each US liaison officer in advance of traffic destined for his station. Incoming convoys were to be escorted by UNEF only as far as the gates of the respective national stations; entry to the stations by UNEF personnel was prohibited under the terms of the Sinai II Agreement. At the entrance to each station, the SFM liaison officer was empowered to inspect all vehicles, their contents and passengers.[23]

The individual components of the multimethod verification system had a combined and mutually reinforcing effect that was greater than they would have had acting independently. This synergism is a key characteristic of the Sinai model.



Δ This is an artist's drawing of the US "Big-Bird" reconnaissance satellite. While not explicitly mentioned in any of the agreements which formed part of the Sinai disengagement process, it seems likely that the US made use of its satellite reconnaissance capabilities to help verify compliance, at least at certain times during the process. It is not clear whether the data from this method of verification were ever communicated to the parties. (Photo from *Aviation Week and Space Technology*).

[22] For details of the UNEF contribution to verification see the "Protocol to the Agreement Between Egypt and Israel", United States Sinai Support Mission, *Report to the Congress*, April 13, 1977, Annex B, pp. 5-14.

[23] *Ibid.*, p. 11.

Table 1
Evolution of the Multimethod Interlocking Verification System in the Sinai

METHOD	SINAI I January 18, 1974	SINAI II September 4, 1975
A. GROUND	1) Buffer zone of complete disengagement. 2) Zones of limited forces.	1) Buffer zone of complete disengagement. 2) Zones of limited forces. 3) Monitoring of Egyptian civil administration of Gulf of Suez zone.
1) Third Party	UNEF stationed in buffer zone; inspection by existing procedures (i.e., on-site inspection).	1) UNEF stationed in buffer zone. 2) UNEF monitoring Egyptian civilian administration in Gulf of Suez zone. 3) US operation of early warning system in the buffer zone. a) US civilians operated three manned watch stations and four unmanned sensor fields to provide tactical early warning. b) US civilians verified operations of national surveillance stations.
2) National Means	Egyptian and Israeli liaison officers attached to UNEF to observe and facilitate UNEF activities in the buffer zone and limited forces zones.	Egypt and Israel each operated a national surveillance station to provide strategic early warning.
B. AIR	No formal aerial surveillance by Egypt, Israel or third parties stipulated by the Agreement. As noted in the Sinai II Agreement, there was to be a continuation of aerial reconnaissance missions over the areas covered by the agreement following the same procedures *already in practice*.	Reconnaissance missions over the areas covered by the Agreement.

Table 1 continued

METHOD	SINAI I January 18, 1974	SINAI II September 4, 1975
1) Third Party	No formal role in this Agreement.	US reconnaissance missions, one every seven to ten days, or at the request of Egypt, Israel or the UNEF. Aerial surveillance undertaken over buffer zone and limited forces zones.
2) National Means	No national surveillance of buffer zones and limited forces zones, but Egyptian and Israeli air operations permitted to respective lines of disengagement without interference.	Egypt and Israel permitted to conduct reconnaissance flights up to middle of buffer zone in an agreed schedule. Aircraft from either side permitted to fly freely up to forward line of their respective zones.
C. SPACE	Not formally mentioned in Agreement, though photo reconnaissance assumed to be performed by US.	Not formally mentioned in Agreement, though photo reconnaissance assumed to be performed by US.
D. CONSULTATIVE MECHANISM	The verification system was administered/implemented by the military representatives of Egypt and Israel under the aegis of the UN through the "Kilometre 101" talks.	Joint Commission established to resolve problems of implementing disengagement and to prevent errors of misinterpretation.

Table 1 continued

Evolution of the Multimethod Interlocking Verification System in the Sinai

METHOD	PEACE TREATY March 26, 1979	
	I. Withdrawal Period (1979-April 1982)*	II. (MFO) Post Withdrawal Period (April 1982 — present)**
A. GROUND	Buffer zones and zones of limited forces associated with interim withdrawals.	Four zones established (A, B, C, D).
1) Third Party	1) United Nations Force and Observers (later the SFM)*** supervises implementation of Treaty and prevents violations of terms of withdrawal. a) Periodic inspections in the limited forces zones; carried out at least twice each month. b) Observation in the temporary buffer zone. c) Performance of reconnaissance patrols and establishment of observation posts along the international boundary, along Line B and within Zone C.	1) MFO operation of checkpoints, reconnaissance patrols and observation posts along the international boundary and along Line B within Zone C. a) Periodic inspection of the implementation of Treaty provisions regarding the zones of limited armaments. b) Additional inspections within 48 hours after receiving a request from either party.
2) National Means	Israel only: four military technical installations in the buffer zone (to be withdrawn at time of complete Israeli withdrawal). Egypt and Israel permitted to operate early warning systems in Zones A and D.	
B. AIR	Aerial surveillance in accordance with previous agreements.	
1) Third Party	US provision of airborne surveillance flights in accordance with previous agreements until the completion of final Israeli withdrawal. Either party or the UNEF could request additional inspection flights.	Verification flights by MFO aircraft cleared with the authorities of the respective parties.
2) National Means	Reconnaissance flights by Egypt and Israel only over Zones A and D respectively	Reconnaissance flights by Egypt and Israel only over Zones A and D respectively.

Table 1 continued

METHOD	PEACE TREATY March 26, 1979 I. Withdrawal Period (1979 – April 1982)*	II. (MFO) Post Withdrawal Period (April 1982 – present)**
C. SPACE	Not formally mentioned in Treaty, though photo reconnaissance assumed to be performed by US.	Not formally mentioned in Treaty, though photo reconnaissance assumed to be performed by US.
D. CONSULTATIVE MECHANISM	Joint Commission and Liaison System established to: 1) Supervise implementation of Treaty arrangements. 2) Co-ordinate military movements and supervise their implementation. 3) Seek to resolve any problems arising out of Treaty implementation. 4) Discuss Treaty violations reported by the UN Force and Observers and refer to Israel and Egypt any unresolved problems. 5) Assist the UN Force and Observers in executing their mandate. 6) Deal with timetables of periodic inspections.	MFO reports summarizing the findings of checkpoints, observation posts and reconnaissance patrols transmitted to Egypt and Israel through the Liaison System.

* In accordance with the actual terms of the Peace Treaty.

** With the Soviet veto of further UN participation in the Peace Treaty process, the Multinational Force and Observers (MFO) undertook the functions and responsibilities stipulated in the Treaty for the UN Force and Observers.

*** American SFM continued operations in accordance with previous agreements until Israeli withdrawal east of the passes (and thereafter terminated).

3(g) *The Compliance Record 1976-80*

The early warning component of the verification system in the Sinai operated from February 22, 1976, to January 25, 1980. During this period 90 violations were reported to Egypt, Israel and the UN of which 67 were attributed to Israel; Egypt accounted for only 2 violations. Nineteen unidentified aircraft overflights and two unauthorized personnel intrusions accounted for the remainder. The high number of Israeli violations may be explained by the fact that the Israeli limited forces zone shared a common border with the early warning zone, whereas the buffer zone separated the early warning zone from the Egyptian limited-force zone.[24] For the most part, all violations were deemed to be small infractions easily detected, identified and corrected with the assistance of the highly effective reporting and consultative components of the verification system. In its four years of operation, the verification system managed successfully to safeguard the integrity of the Sinai II Agreement. The use of the Joint Commission (see Table 1) by the parties to resolve ambiguous situations also greatly enhanced the confidence of the parties in the new security arrangements in the Sinai. The task assigned to the Joint Commission by Article VI of the Sinai II Agreement was to consider any problem arising from the Agreement and to assist the UNEF in the execution of its mandate. The commission met under the chairmanship of the Chief Coordinator of the United Nations Peacekeeping Missions in the Middle East or his representative. It was composed of each party to the Agreement.

4. The Egypt-Israel Peace Treaty: Consolidating Past Achievements, 1979-82

4(a) *Overview*

The second phase of Sinai verification operations began after the signing of the Egypt-Israel Peace Treaty on March 26, 1979. Following 30 years of conflict, Egypt and Israel agreed to formalize security arrangements along their common border. Complete withdrawal by Israel from the Sinai was, however, contingent upon the guarantee of satisfactory security arrangements. In accordance with the Treaty, the parties agreed to the stationing of UN personnel in the area to supervise the implementation of various Treaty terms and to prevent any violations.[25]

Unfortunately, even before the actual signing of the Peace Treaty, the Soviet Union insisted that it would veto the participation by the UN in the implementation of the Treaty. In anticipation of the Soviet veto, which reflected Moscow's displeasure with the Camp David accords, and unilateral American mediation efforts in particular, the US provided the parties with a letter (as part of the Peace Treaty package) in which Washington agreed that if the UN Security Council failed to establish and maintain the arrangements called for in the Treaty the US "would be prepared to take those steps necessary to ensure the establishment and maintenance of an acceptable alternative multinational force".[26]

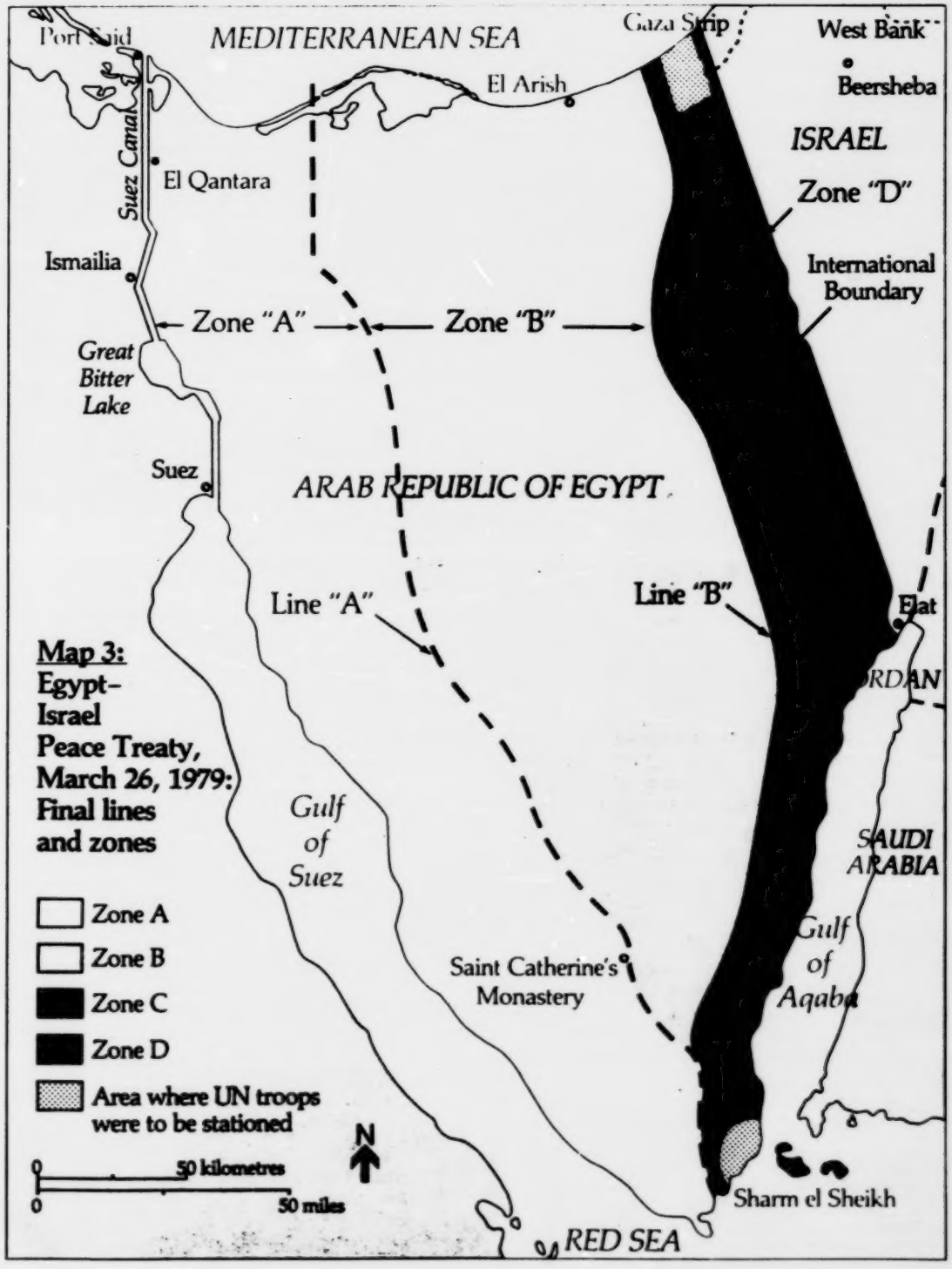
As expected, when the UNEF II mandate was to be renewed on July 24, 1979, the Security Council refused to extend its stay in the Sinai, thereby ending the role the UNEF had played since 1974. At the same time, Israel objected to the deployment of the United Nations Truce Supervision Organization (UNTSO) on the grounds that UNTSO was unable to perform the functions given to the "forces and

---

[24] United States Sinai Support Mission, *Watch in the Sinai*, p. 30. There were more Israeli violations due to the location of the early warning system within the Sinai buffer zone. Because the eastern end of the early warning area was contiguous with the western edge of the Israeli limited forces zone, shallow penetrations by Israelis into the early warning area were readily detected. The western boundary, however, was approximately five miles east of the Egyptian limited forces zone so possible similar penetrations of the buffer zone by the Egyptians were beyond the early warning area and hence not detected. See United States Sinai Support Mission, *Report to the Congress*, April 13, 1977, p. 7.

[25] Mala Tabory, *The Multinational Force and Observers in the Sinai: Organization, Structure and Function* (Boulder, Colorado: Westview Press, 1986), p. 2.

[26] *Ibid.*, p. 3.



Map 3: Egypt–Israel Peace Treaty, March 26, 1979: Final lines and zones

observers" under the Treaty. With the elimination of the UN from the post-Treaty verification process, it was imperative to implement alternative methods of supervision quickly. Shortly after Israel undertook the initial steps in the first phase of withdrawal to the El-Arish-Ras Muhammed interim line, Egyptian, Israeli and US officials met in Washington on September 18 to 19, 1979, to discuss alternative supervisory options. The parties agreed to a three-pronged interlocking approach: joint Egyptian-Israeli supervision of an interim buffer zone (in the El-Arish area); continued supervision by the SFM of the remaining areas evacuated by Israel; and continued US airborne surveillance flights over the Sinai.[27]

The three years of relative stability from the beginning of the SFM's operations in 1976 until the signing of the Peace Treaty had already done much to convince both sides of the value of mutual restraint. The successful blend of technology and peacekeeping had persuaded both sides that security need not be jeopardized by territorial concessions or intrusive verification measures, especially if the implementation of any new agreement was to be supervised by trusted and credible third parties. Thus, when faced with the inability to renew the UNEF mandate, the Egyptian and Israeli governments requested that the SFM continue to supervise the Israeli withdrawal from the Sinai from February 1980 to April 1982, rather than to disband in January 1980 as stipulated in the Peace Treaty. The successful precedent of the SFM's past operation provided the parties with an attractive option.

4(b) *New Sinai Field Mission Verification Responsibilities: On-Site Inspection and Aerial Patrols*

In light of the new security arrangements prescribed by the Treaty, the functions of the SFM along with the US role in Sinai had to be modified. New SFM responsibilities in accordance with the terms of the Peace Treaty included inspections of Egyptian military installations in the buffer zones and of the four Israeli technical stations located in the interim buffer zone.[28] US surveillance flights seem now to have been performed by the SFM on a weekly basis to verify compliance with force level and personnel limitations.

In order to fulfil these new responsibilities, a number of changes were required in the areas of communication and aircraft support. For example, the SFM was still limited to a staff of no more than 200 American civilian personnel even though it was now responsible for covering about 38 850 km² (i.e., two-thirds of the Sinai) rather than the approximately 622 km² it had monitored previously.[29] Operationally, this meant inspection teams required the extensive use of helicopters as well as short take-off and landing (STOL) aircraft.

SFM inspection teams undertook bi-monthly on-site inspections of Egyptian military forces in the two zones of limited armament (A and B) and at the four Israeli technical sites in Zone C (Zone D, the Israeli force limitation zone, was originally to be monitored by UN observers). Two days were required to inspect Zone A, one day for Zone B and one day for the four Israeli technical installations.[30] Inspections were conducted by four three-member teams composed of an SFM civilian liaison officer, the SFM observer/advisor (a US civilian contract

---

[27] *Ibid.*, pp. 4-6.

[28] For details of new US Sinai Field Mission verification responsibilities see Table I.

[29] United States Sinai Support Mission, *Peace in the Sinai*, pp. 2-3.

[30] *Ibid.*, p. 9.

employee trained to identify military organization and equipment) and a liaison officer representing the party to be inspected. Each inspection took the form of a brief meeting with a ranking officer of the unit to be inspected who reported on the status of personnel and controlled weapons in the sector and on any major shift in the location of accountable units. This meeting was followed by a visual check of accountable vehicles, weapons and personnel. Each of the three inspection team members recorded his or her *own* account of controlled items. Beyond providing a triple check on accountable items, this procedure reduced the likelihood of having the count challenged later by Egyptian or Israeli authorities.[31]

The Israeli technical sites in the Interim Buffer Zone were inspected on a monthly basis. SFM teams flew directly to the sites where they counted personnel, and inspected operation areas and defensive positions.[32]

SFM aerial reconnaissance of Zones A and B (Egypt) was conducted over a two-day period, prior to a scheduled on-site inspection. The northern part of the two zones was surveyed on the first day with the remainder surveyed the following day. While aircraft normally flew at altitudes of 244 to 305 metres, inspection teams often undertook "close look" surveillance of various military formations and installations.[33] Significantly, landings during reconnaissance missions were not permitted except at designated refuelling points. Egypt and Israel, in accordance with Treaty stipulation, could only fly reconnaissance missions over Zones A and D respectively.

Wherever possible, the same SFM personnel carried out both the low-level aerial reconnaissance and the on-site inspection of the same sector during a given inspection cycle, thereby providing increased familiarity with the location of units and weapons being inspected. To counter problems of over-familiarity and complacency, however, assignments were rotated to give personnel a wider array of experience in all aspects of the verification process.[34] Finally, to ensure strict accountability, formal debriefings of all inspection personnel were held after each inspection. Using the various team reports, the SFM Operations Unit prepared a consolidated report of the inspection results, including a tabulation of personnel and weapons counts. Standardized reporting ensured that both parties received only the information necessary to verify Treaty compliance. This approach helped the SFM avoid allegations of "probing" for the purpose of military intelligence gathering.

4(c) *The Compliance Record: 1979-82*

Differences in Egyptian and Israeli military organization and structure created problems of interpretation over the nature of a "division", "allowable" fortifications and differences between "mortars" and "artillery pieces". For example, Israel claimed that Egypt had reinforced mechanized infantry divisions in Zone A, a formation Israel regarded as contrary to a "normal" mechanized infantry division. However, since Egypt did not exceed limitations on weapons and personnel, the SFM recognized the Egyptian version of a "division".[35] Issues of interpretation pertaining to distinctions between mortars and artillery pieces (160 mm mortars were classified as artillery pieces) and the number and location of field fortifications were resolved by the SFM and, where necessary, by the parties themselves in various meetings of the Liaison System. The Liaison System was established under Article VII of Annex 1 of the Peace Treaty to take effect upon the dissolution of the Joint Commission of the Sinai II Agreement. It was intended to assess progress in implementing the obligations assumed under the annex, to

[31] *Ibid.*, p. 10.

[32] *Ibid.*

[33] *Ibid.*, p. 9.

[34] *Ibid.*

[35] *Ibid.*, p. 11.

resolve problems that might arise, and to prevent situations resulting from errors or miscalculations. Unresolved matters were to be referred to higher military authorities. Both Egypt and Israel established a Liaison Office headed by a military officer. A direct telephone link was set up between the two liaison offices and each also had a direct link to the UN command.

From April 1980 to April 25, 1982, 29 violations were cited by the inspection teams; 27 were attributed to Egypt and 2 to Israel.[36] None, however, were deemed serious enough to undermine the integrity of the Peace Treaty regime.

4(d) *Phasing Out of the SFM: April 1982*

At the time the Peace Treaty was signed, it was presumed the UN would provide a peacekeeping force to supervise the security arrangements in the Sinai after Israel's final withdrawal on April 25, 1982. When it became apparent the UN would be unable to fulfil this role, American, Egyptian and Israeli officials agreed to the establishment of an alternative multilateral force. On August 3, 1981, the parties signed a Protocol to the Peace Treaty leading to the creation of the Multinational Force and Observers (MFO) in which US participation was requested by Egypt and Israel.[37] Beyond contributing an infantry battalion, a logistics unit and a civilian observer group, the US also provided the first Director General of the force, Leamon R. Hunt.

The Sinai Support Mission (SSM) contributed much technical and organizational expertise to the critical start-up period of the MFO during which it was essential to achieve the timely and orderly transfer of the SFM's verification responsibilities to the new observer group. Moreover, the SSM staff assisted the Director General's office in the administrative and legal aspects of planning the MFO. Finally, the SSM director served as senior advisor to the US delegation in negotiations leading to the creation of the multinational force.

[36] *Ibid.*, p. 12.

[37] *Ibid.*, p. 21.

Part II

Multimethod Verification in the Sinai: Prerequisites and Lessons

Having described the Sinai experience in historical terms, the next step is to generalize from this description by identifying the prerequisites for the Sinai operation's success and drawing some appropriate lessons.

1. Key Characteristics of the Sinai Verification Experience

A number of factors, integrated in a unique manner, were responsible for the success of the Sinai operation. A review of these will be critical in determining their applicability to other cases. For analytical purposes, these factors can be divided into three general sets: political-military, geographic-physical environment, and technical-operational. It is important to emphasize that these categories overlap considerably.

1(a) *Political-Military Factors*

i) In the aftermath of the 1973 October War, military victory at tolerable costs was no longer perceived by either side as a viable military option; each party recognized that it could not advance its national security objectives unilaterally by prolonging the conflict.

ii) Both parties wanted to avoid war and demonstrated a commitment to peace-building even in the absence of a prior history of restraint.

iii) The parties recognized that the future of domestic political elites could be jeopardized by the economic burdens imposed by continuing the conflict.

iv) A third-party-assisted verification system, operated by trusted and credible third parties, was seen by the parties as a useful mechanism for reducing fears of surprise attack and war by miscalculation. In short, the verification system contributed to risk management.

v) An active third-party role was essential to negotiate and implement the disengagement and verification process. The United States, together with the UN, was willing to bear much of the financial burden for implementing the verification system.

vi) Direct parties to the conflict viewed these third parties as motivated to provide (and capable of providing) substantial incentives and disincentives for restraint on cross-border incursions and military preparations.

vii) Military commanders and political leaders believed that intrusive third-party verification measures would not necessarily undermine national security objectives. Military leaders believed the information and reporting procedures associated with a verification regime — that is, the high degree of transparency associated with such systems — would not create an intelligence imbalance in favour of regional adversaries and their external supporters. Nor did they fear the verification system would impose a loss of national independence or restrict the policy latitude that might otherwise be available.

viii) The presence of only two adversaries simplified the task of developing a verification system tailored to meet their particular security requirements.

ix) Both sides possessed sufficient technical sophistication and discipline to undertake the process of disengagement in an orderly fashion.

x) Breaking down the overall process into reciprocal step-by-step stages allowed the parties to learn from the experience provided by precedent agreements. The incremental nature of this approach was a key factor in allowing the parties to develop confidence in the risk management measures adopted to reduce this habitual military conflict. With the signing of the Sinai I Agreement, the parties accepted the utility of demilitarized zones, buffer zones and a thinning out of military forces at intervals the closer they are to the border, as a useful way to manage a changing security relationship. With each new agreement, Egypt and Israel were able to build on preceding measures.

xi) Each component of the verification system had a clear and appropriate mandate. Both parties recognized these limited mandates and consequently, their expectations were, for the most part, limited and realistic.

xii) The relative insulation of the disengagement process from those unsympathetic to the process — including sub-national groups and guerrillas, as well as other state actors — provided the parties with an uninterrupted opportunity to build confidence in their new relationship over time.

1(b) *Geographic-Physical Factors*

xiii) The Sinai presented very favourable geographic circumstances for the implementation of the disengagement and verification scheme. The sparsely populated desert terrain offered natural barriers and chokepoints that facilitated aerial surveillance and on-site inspections. The Sinai's terrain and physical environment (including the relatively stable climate) was particularly well suited for easy target detection and identification by advanced sensing devices, thereby minimizing false alarms.

xiv) The parties to the agreements, as well as the participating third parties, had only to be concerned with one contiguous border.

1(c) *Technical-Operational Factors*

xv) The verification system was configured in such a way as to create interlocking responsibilities among the SFM, UNEF II, and the national surveillance stations along with Egyptian, Israeli and American aerial surveillance. This contributed to the efficient and effective use of resources. Each of these components of the verification system carried out its carefully prescribed role within geographic areas that were limited, manageable and well-defined.

xvi) The use of mutually reinforcing multiple verification methods (including ground, air and space elements) provided a synergy which enhanced the effectiveness of the entire verification system. Watch stations were installed where observer personnel could monitor unattended sensor fields and identify potential intrusions using high-power binoculars, night observation devices and remotely controlled day and night television cameras. The UNEF, and later the SFM, maintained complete control over the buffer zone and conducted on-site inspections in the adjacent limited forces zones.

US aerial reconnaissance was undertaken over the UNEF buffer zone, the limited forces zones and the Gidi and Mitla passes. Under the terms of the 1979 Peace Treaty, the US undertook more extensive aerial inspections, while Egypt and Israel also conducted aerial inspections within zones adjacent to their national borders as stipulated by the Sinai II Agreement and the Peace Treaty. While never explicitly stated in formal documents, the United States probably conducted satellite reconnaissance missions over the buffer zone and limited forces zones. Whether the results of such space surveillance were ever provided to the parties is not clear; however, the results of aerial reconnaissance were given to the parties.

The final component of the verification system was the procedures for dealing with complaints and ambiguous situations concerning compliance. These procedures included the Joint Commission under Sinai II and the Liaison Committee under the 1979 Peace Treaty.

xvii) At the operational level, the verification mission was unambiguous and comprehensive. The verification mission included (A) observing, documenting and reporting on activities in areas defined by the disengagement agreements and the Peace Treaty; (B) patrolling borders separating

the parties; (C) intercepting unauthorized personnel and equipment from the limited forces zones; (D) observing and inspecting the equipment and troops of the parties; (E) monitoring the transfers of military equipment into zones of limitation as well as their withdrawal; (F) monitoring installations and movements of ground vehicles, aircraft and people; and, (G) investigating allegations about threatening actions by the parties toward each other, including preparatory actions or build-ups.

The parties understood the technical limits of the verification system (i.e., it was complementary to, but not a substitute for, national intelligence) and the kinds of specific information it could and could not provide. When specific concerns arose about compliance, procedures such as using the Joint Commission could be followed to reassure the parties.

xviii) The verification system was technology-intensive and highly innovative. In order to operate with a minimum of personnel, without sacrificing efficiency or effectiveness, the SFM (with a maximum allowable staff of 200) exploited and refined the application of short-range and remote sensing technology. By employing proven technology, one person located at a monitoring facility could "watch" a border or an area that otherwise would require a substantial force to patrol. When an apparent intrusion was detected, a small reaction team could be dispatched to investigate the incident.[38]

xix) The verification system was flexible insofar as its mission could be modified to reflect inspection and compliance requirements in new agreements. Since the SFM already had the full support of the parties in fulfilling its early warning responsibilities, it was not difficult, when circumstances changed, for the SFM to sustain its existing operations and modify its role in accordance with the new inspection and compliance requirements posed by the Egypt-Israel Peace Treaty.

xx) The technical infrastructure of the verification system (sensor and communication systems) and its associated personnel were not subject to interference or countermeasures. Over the course of the six years in which the verification system operated in the Sinai, no intentional efforts were made to interfere with its operation. Egypt, Israel, the United States and the UNEF were all keen to ensure the success of the verification enterprise.

[38] It is a principal argument of this paper that technology-intensive verification methods can reduce manpower requirements significantly and thereby ease concerns regarding intrusiveness and sovereignty. The question then arises, why, after the Israeli withdrawal from the Sinai — with the SFM verification system apparently working so well — did the parties opt for a return to the more traditional kind of multinational peacekeeping requiring much greater manpower and heightened visibility on Egyptian territory? It is possible to speculate that with the full return of the Sinai to Egypt under a formal peace treaty, the political and symbolic qualities of verification now assumed greater importance than the technical and innovative requirements of verification. With both parties placing so much at risk in signing the Treaty, it was incumbent on Egypt, Israel and the United States (in the absence of UN involvement) to demonstrate as much wide-ranging political support for the new Treaty as possible. Within this context, the MFO would appear to fulfil an important political/symbolic requirement beyond verifying compliance with the Peace Treaty.

2. Ten Lessons from the Sinai Experience for Arms Control Verification and Risk Management

The success of the verification procedures in the Sinai offer some important lessons regarding the potential contribution of third-party-assisted multimethod verification to regional conflict management. As these lessons indicate, verification served a number of functions (i.e., early warning detection, deterrence and confidence-building) the prominence of which varied with time and context.

Lesson No. 1: Risk management perspective: The verification process assists the parties initially in managing the short-term risks of agreement.

With the assistance of the United States, Egypt and Israel implemented an elaborate verification system that enabled them to pursue a limited accommodation even in the face of ongoing mistrust. Initially, the verification system served an important risk reduction function by dampening incentives for surprise attack, thinning out forces near forward areas and clarifying ambiguous activities. In this sense, the detection function of verification was paramount. Once the parties reconciled themselves to the constraints (as well as came to see the benefits) associated with verification, confidence in the system contributed to the gradual building of confidence between the parties.

The Sinai experience indicates that in the early phases of disengagement, the functions of a verification system for the parties may be quite different from later phases. For example, in the immediate aftermath of hostilities, when confidence is virtually non-existent and there is an urgent need to implement risk management procedures for a new agreement, the verification system may be viewed by the parties mainly as providing early warning. At this critical juncture, (i.e., with an Israeli presence still in the Sinai), the parties are concerned with having sufficient warning time to mount an adequate and immediate military response to counter any threat. In relinquishing strategic depth, Israel required a verification system that would warn of a rapid reinforcement of Egyptian forces in the Sinai which could then surge through the passes. For its part, in the aftermath of the October War, Egypt needed confirmation that Israeli forces would not again be within striking distance of the Egyptian heartland.

Lesson No. 2: Confidence-building perspective: The confidence-building function of verification is critical where the verification system itself is the centrepiece of a very tenuous relationship with no history of conflict management and where there is a fear that non-compliance will result in the use of force.

In the highly charged atmosphere that characterized the early stages of the Sinai experience, incentives for mutual recrimination and defection were sufficiently significant to require the verification system — both in symbolic and strategic terms — to prove itself operationally effective and thereby provide the parties with initial confidence. In this environment, the collapse of the verification regime due to non-compliance might have resulted in a return to the use of force to resolve fundamental differences. This was especially the case for Egypt and Israel where the breakdown of the regime would have heightened feelings of strategic vulnerability as both sides maintained armed forces dangerously close to each other in the Sinai. Though there were strong political and military incentives on each side to avoid another war, the successful operation of the verification

system itself was crucial in reinforcing new attitudes toward management of the Arab-Israeli conflict.

However, once the verification system had withstood the initial "litmus test" of intentions, thereby strengthening the domestic position of those in power who had opted for a policy of disengagement rather than confrontation, a growing record of demonstrated compliance further buttressed confidence. For Egypt and Israel, the signing of the 1979 Peace Treaty was due, in large part, to the successful record of the verification system in the three years preceding the Treaty. With the assistance of the United States, the UNEF and the Joint Commission (for clarifying ambiguous activities), the parties proved capable of coping with small technical violations in a way that did not fuel suspicion or undermine the integrity of the Sinai II Agreement. In short, between 1976 and 1979, both sides had invested so heavily in the success of the verification enterprise that defection would have been politically and strategically counterproductive. Thus, both the effective operation of the verification system and a successful record of demonstrated compliance led to increased confidence among the parties.

Contrary to the popular proposition that political co-operation and a general easing of tensions must precede progress in arms control, the Sinai case strongly suggests that confidence emanating from the successful verification of a military agreement can precede and ultimately advance political accommodation between the parties. An effective verification system in the Sinai helped to build trust between the parties.

In the context of this lesson, it is interesting to speculate whether the confidence-building function of verification varies in importance depending on the countries involved. The confidence-building function may be less critical for states that have long-established political relations and institutionalized rules for conflict management. In contrast, it may be more important for proximate hostile states who perceive their conflict in more immediate terms and have no experience in generating co-operative behaviour. More specifically, one might ask whether the confidence-building function of verification is less important for the US and the Soviet Union (than the deterrence and detection functions) owing to the availability of alternative mechanisms for coping with serious disagreements on matters of national security. It might be argued that the implications of "backsliding" from a primary commitment may be less threatening in more stable adversary relationships where there are more numerous interactions and agreements from which to extrapolate proof of compliance and future intentions.

Lesson No. 3: In conflict-prone areas, third parties can be essential for helping disputants manage the risks of agreement.

In offering the parties diplomatic support and financial guarantees, the US played a critical role in helping to negotiate both the Sinai II Agreement and the Egypt-Israel Peace Treaty. Equally important, in assisting with the verification of these agreements, the US provided significant technical and logistical expertise in the form of sensor packages, aerial surveillance, the infrastructure for the SFM and skilled manpower — all of which, together with the assistance of the UN, were critical for the operation of the verification system from 1976 to 1982. Through its active verification role, the US demonstrated a strong political and financial commitment to the peace process, thereby enabling the parties to broaden the scope of their collaboration and manage greater risks over time.

Lesson No. 4: The process by which a verification regime is established is equally (and perhaps more) important than the substantive technical services provided to the parties.

The very process of negotiating verification procedures may serve as a prime indicator of the extent to which the parties are sincere in their efforts to establish a limited form of co-operation.[39] This is especially true for agreements involving third parties with a highly visible and intrusive verification system. Egyptian and Israeli acceptance of an active verification role for the United States in itself served as a demonstration of good faith on both sides. The very process of accepting an intrusive supervisory presence — by producing evidence of the conciliatory disposition of the parties — played a key role in reducing suspicion, thereby creating further incentive for co-operation.

Lesson No. 5: In negotiating new security arrangements multimethod verification procedures can assist the parties in meeting different objectives.

In the case of Sinai II, Israel needed stringent verification procedures for early warning and detection purposes. Israel had relied on such procedures prior to signing the Sinai II Agreement and insisted, therefore, on retaining a previously functioning national early warning station as a condition for accepting the Agreement. In short, due to the nature of its reserve mobilization system, Israel attached a higher value to the detection and deterrence functions of verification than did Egypt.

By contrast, Egypt had less military need for early warning and detection but did, for political reasons, require a national watch station in order to make the US the central component of the verification system and to create the impression of strategic symmetry with Israel.

Lesson No. 6: The use of technology-intensive verification procedures can assist the parties in avoiding situations that appear to infringe upon sovereignty.

Remembering well Egypt's difficulties with Soviet military advisers, and highly sensitive to domestic concerns regarding Egyptian sovereignty over the Sinai, President Sadat insisted that any foreign presence in Sinai had to be temporary and politically unobtrusive. The use of technology-intensive verification procedures helped limit the size of the foreign contingent, thereby minimizing the appearance of intrusiveness. In short, Sadat could sustain the long process of Israeli withdrawal politically by arguing that all measures necessary for verification were merely part of a transition to return all of Sinai to Egypt. Once the sensitivity of the sovereignty issue was overcome through Israel's complete withdrawal, a return to traditional peacekeeping practices was acceptable to Egypt as indicated by the presence of the Multinational Force and Observers (MFO).

[39] Where the parties to a dispute have no experience in regulating their conflict behaviour, even a willingness to entertain the idea of negotiations concerning their future relationship can provide important evidence regarding commitment and seriousness.

Lesson No. 7: The synergistic effect of multimethod verification measures incorporating interlocking responsibilities can provide the necessary impetus for more far-reaching arms limitation and verification arrangements.

By its very design, the multimethod verification enterprise in the Sinai created mutually reinforcing interlocking responsibilities among the parties, the UNEF and the US, which strengthened the viability of the disengagement process as it evolved — success was built upon success. In addition, the synergistic integration of individual verification components in the form of unattended ground sensors with on-site and aerial inspections, contributed to the creation of a verification system whose basic elements could be applied directly or with some modification to subsequent agreements. For example, in the Peace Treaty negotiations of 1979, American, Egyptian and Israeli officials did not have to search for new verification procedures since precedent had already established the basic parameters of a verification system appropriate to this particular setting. Knowing which verification procedures worked well in the past facilitated negotiations and enhanced the prospects for a mutually satisfactory outcome.

Lesson No. 8: Parties are better able to manage the risks of agreement when evidence of compliance is unambiguous.

The process of verifying compliance with the Sinai II Agreement and the Egypt-Israel Peace Treaty was particularly thorough. The parties could operate confidently within the constraints imposed by the agreements knowing that the military activities of both sides were being monitored carefully by national liaison officers, UN observers, US civilian personnel and US overflights.

The success of any verification system depends to a large extent on the ability to report on and deal with apparent violations in an accurate and timely fashion to minimize mistrust and suspicion. In the case of Sinai II and the Peace Treaty, a number of procedures were used to ensure reliable confirmation of compliance. First, reports from on-site inspections were triple-checked, taking into account the independent assessments of each member of the three-person inspection teams. Second, the SFM Operations Unit issued its findings expeditiously with reports produced in a standardized format to ensure a common baseline of comparison for all parties. This method of reporting was especially important for Egypt and Israel domestically since it enabled both sides to satisfy internal objections regarding entering into an agreement with a long-time enemy. Finally, through the Joint Commission established under Sinai II (later to become the Liaison System under the Peace Treaty), the parties had at their disposal a mechanism for resolving any ambiguous situations that arose.

Having clear evidence of any breach of an agreement — particularly evidence secured by trusted third parties and broadly accepted by the international community — may serve to protect a nation against domestic and international criticism if the other party fails to perform. Such clear-cut evidence, in both its military and political aspects, is especially important in order to insulate the peace-building process from those actors who have a strong investment in the demise of new agreements to which they are not a party.

Lesson No. 9: Private industry, using proven technology, can make an important contribution to the arms limitation and verification process.

The management of the SFM component of the verification enterprise symbolized an impressive merger of effort between the US government and American private industry. Private industry not only provided much of the technical expertise and personnel necessary for operating the early warning system, but also the sensor technology, with its history of good performance and low maintenance requirements — which contributed significantly to the success of the verification mission. In addition, private industry proved capable of responding to the technical challenges posed by the verification requirements of the Sinai II Agreement and the Peace Treaty within severe time and manpower constraints, in a way that might not have been possible for US government agencies.[40] On short notice, an elaborate verification system was implemented quickly and managed successfully for six years.

The implications of this unique kind of co-operation for the verification of future agreements are considerable, if only because the prevailing perception has been one of private enterprise supporting military ventures and the expansion of the arms race rather than peace-building efforts.

Lesson No. 10: Countries with expertise in verification and peacekeeping such as Canada could make a significant contribution to the verification of agreements similar to those in the Sinai.

The success of the Sinai experience depended to a large extent on integrating such traditional peacekeeping functions as observer patrols, the establishment of control posts, and on-site inspections, with aerial surveillance and ground-based surveillance technology (used for verifying access to the strategic Mitla and Gidi passes and large tracts of the Sinai desert). Given the "twin" capabilities required for this task — peacekeeping and verification — it would appear that Canada is in a unique position to meet both these requirements. Canada not only has long and ongoing operational experience in peacekeeping but also possesses significant technical, industrial and analytical expertise that could be directed toward verifying future agreements between regional adversaries. Making a contribution of this kind would seem to mesh well with the objectives of a middle power committed to international peacekeeping.

[40] This is not to suggest that US government agencies were not capable of doing the job *per se*. Rather, the SSM was concerned that government agencies would not be able to meet its deadline of February 22, 1976 for initial operating capability if it did not turn to private companies with experience in managing operations at remote sites. It is interesting to note here that in its public competition for contractors, the US government sought expertise in the following areas:

a) Previous, recent experience in systems and logistics management contracts at remote international sites;

b) Recent experience with installation, operation, and maintenance of remote sensing and surveillance systems, including acoustic, infra-red, magnetic and seismic sensors and related read-out equipment; and

c) Evidence of availability of skilled manpower to meet the time requirements.

Cited in United States Sinai Support Mission, *Report to the Congress*, April 13, 1976, Appendix F.

Part III

Application of the Sinai Model Elsewhere

1. Potential Candidates for the Sinai Model

In a speech before the first United Nations Special Session on Disarmament in 1978, US Vice-President Walter Mondale noted:

> Our experience in the Middle East has demonstrated that technical assistance with monitoring systems such as aerial photography and ground detection devices can help create the confidence necessary to make disengagement and stabilizing agreements work.

In his speech, Mondale suggested that the basic operational concepts utilized by the SFM could be applied to other conflict-prone borders.

The success of the verification system in the Sinai gives rise to the question: On what other borders in the Middle East or in other regions could such a system monitor compliance with agreements between adversaries involved in the process of restructuring their security relationship? Clearly there are a number of conflict-prone borders that could benefit from such a third-party-assisted multimethod verification system.

In the Middle East there are a number of settings where a modified version of the Sinai model might be usefully applied and have some prospect of improving the security relationship between regional adversaries. The Sinai case-study indicates that the model is most likely to be successful when (A) only two parties are involved and other actors can be prevented from interfering with the process of improving risk management, (B) there is a commitment to developing a political and military framework for an agreement, and (C) third parties are prepared — by providing technical expertise and financial support — to facilitate the process of disengagement and assist in verifying any new agreement.

Before examining potential Middle East candidates, however, two important qualifications must be introduced. First, the successful application of the Sinai model is conditional upon an initial commitment by the parties to develop a political and military framework for an agreement that would restructure their security relationship. At present, indicators pointing favourably towards conflict resolution are virtually non-existent (particularly in the case of Iran and Iraq). Second, while the verification system in the Sinai was simply part of a transition toward a more institutionalized peace-building relationship, supported by more traditional methods of peacekeeping, the early warning and verification procedures suggested in the cases following will likely come to form a permanent feature of the evolving security relationship between the adversaries.

Case 1
BORDER/REGION: Golan Heights
PARTIES: Israel, Syria
POTENTIAL VERIFICATION REGIME:
— National Means
— Immediate Third-Party-Assisted
— Bilateral/Mediated
— Consultative Mechanism

Despite important differences in terrain, a history of extreme animosity and the strategic sensitivity of the Golan to both parties, it is possible to conceive of a "next step" negotiation on the Golan similar to the second interim Agreement (Sinai II) between Egypt and Israel. In extending the formula of "less than total withdrawal for less than total peace", Israel would vacate a portion of the Golan Heights (probably Mount Hermon and the adjoining territory) which would subsequently be demilitarized with the flanking zones on both the Israeli and Syrian sides subject to restrictions on manpower and weapons.[41] This extended disengagement system would be monitored and verified

[41] Nathan A. Pelcovits, *Peacekeeping on Arab-Israeli Fronts: Lessons from the Sinai and Lebanon*, SAIS Papers No. 3. (Boulder: Westview Press, 1984), p. 95.

by national surveillance stations, with third parties manning tactical early warning watch stations and performing additional verification activities such as aerial surveillance. The enlarged demilitarized buffer zone would be monitored by an expanded United Nations Disengagement and Observer Force (UNDOF) with a more authoritative and durable mandate.[42] Given recent advances in sensor technology, the new observer force could make extensive use of upgraded day and night observation devices as well as networks of unattended ground sensors.

Should a new interim agreement be reached, Syria might find a modified observer force patterned on UNDOF to be politically acceptable insofar as it would require only an incremental change in the present security system. For Israel, acceptance of any new arrangement on the Golan would likely be conditional upon US agreement to maintain a physical presence on the Golan either by manning early warning stations directly or by adopting a more elaborate system whereby observers/inspectors verified the demilitarized and limited forces zones. Israel would, no doubt, insist that US aerial monitoring, which now reinforces the UNDOF, be upgraded and deployed more frequently. Whether Syria would accept a US presence on the Golan, however, remains unclear.[43]

Δ This observation post of the United Nations Truce Supervisory Organization (UNTSO) on the Golan Heights between Syria and Israel is staffed by observers from several nations, including Canada. From similar posts in the Sinai, personnel were able to observe and report happenings which might have violated the Sinai Disengagement Agreements and the Egypt-Israel Peace Treaty. In the Gidi and Mitla passes the Sinai Field Mission, composed of US civilian contract personnel, established sophisticated sensing devices to assist in monitoring vehicular and other movements in these areas during the Sinai II Disengagement Agreement. Ground-based observation posts and sensor fields constituted one of several components of the verification system for these agreements. (Canadian Forces Photo).

[42] *Ibid.*, p. 96.

[43] In contrast to the Sinai experience where Egypt's President Sadat was eager to have a US presence in the Sinai as part of a broader foreign policy strategy of seeking closer ties with Washington, President Assad had no such desires and remained very much tied to his Soviet patron. Within these constraints (including unremitting hostility toward Israel and the US), Syria may only consider a third-party presence that does not include the US. Israel, of course, would then be forced to consider whether other third-party candidates are suitable.

Case 2
BORDER/REGION: West Bank-Jordan River Valley
PARTIES: Israel, Jordan
POTENTIAL VERIFICATION REGIME:
— National Means with Incremental Transition to Third-Party-Assisted
— Bilateral/Mediated
— Consultative Mechanism

The West Bank-Jordan River Valley separating Israel and Jordan is another key Middle Eastern border where some form of early warning "tripwire" system together with a closely verified demilitarized buffer zone might usefully advance security interests. This is not to suggest, however, that all aspects of the Sinai model are readily transferable to the West Bank. On the contrary, it would likely be only the surveillance/sensor package successfully deployed in the Sinai — as distinct from the third-party day-to-day operational management of the Sinai system — that would be useful.

From Israel's perspective, the absence of strategic depth and warning time (together with cultural-historical factors) would require the stationing of significant numbers of regular forces in fortified positions at key strategic points on a permanent basis.[44] Thus, an early warning system and verification procedures would remain a permanent feature of the landscape and not serve merely as elements of a transitional arrangement leading to complete and total withdrawal from the area.[45]

Because of acute Israeli security concerns regarding the ability to protect its heartland, the role of a third party in verifying compliance with any Israel-Jordan agreement could at best be viewed only as a supplement to and not a substitute for an Israeli military presence. In contrast to the sparsely populated Sinai desert where Israel enjoyed sufficient time to mobilize reserves, the narrow and densely populated West Bank would require that any early warning system and accompanying verification measures be virtually automatic, largely unmanned or manned by Israeli personnel only. The adversary's armed penetration of the zone, in breach of its obligations, would need to trigger a warning of noncompliance in time for Israel to take immediate protective measures.[46] Similar early warning concerns for Israel would also be present on the Golan Heights.

The success of an early warning and verification system on the West Bank would depend critically on a network of long-range detection devices and surveillance outposts equipped with remotely controlled imaging devices. Because of its dense population and varied topography, ground sensor networks would have to be configured in such a way as to minimize false alarms and disruption. Again, in contrast to the Sinai, special measures would be needed to protect the system from sabotage and subversion by local settlers, opposition groups and terrorists.

Perhaps over the long term, a third-party verification mechanism might be introduced whereby the Israeli military presence would be

[44] Nathan A. Pelcovits, *Peacekeeping on Arab-Israeli Fronts*, pp. 98-99.

[45] *Ibid.*, p. 99.

[46] *Ibid.*

scaled down as civilian functions were transferred to an autonomous administration.[47] Under these circumstances, the US could play an important role in verifying the demilitarized buffer zone.

Jordanian acceptance of the early warning and verification measures noted above — including the stationing of Israeli forces in key strategic pockets — would undoubtedly be conditional upon tacit Palestinian acquiescence to the proposed security arrangements. Any military arrangement that would merely enhance relations between Jordan and Israel, thereby reinforcing the status quo, would likely be deemed unacceptable by certain elements within the Palestinian leadership.[48]

Case 3
BORDER/REGION: Israel-Lebanon
PARTIES: Israel, Lebanon, Syria
POTENTIAL VERIFICATION REGIME:
— National Means
— Immediate Third-Party-Assisted
— Bilateral/Mediated
— Consultative Mechanism

The inadequacies of recent attempts at conventional peacekeeping in Lebanon have shown that both the negotiation and implementation of stabilizing measures in situations of protracted crisis have become a dangerous and politically costly enterprise. In spite of the withdrawal of Israeli forces from Lebanon (except for a small security zone occupied by Israel) peacekeeping efforts have escalated rather than reduced conflict. The absence of a clear mandate for the 1982-84 Multinational Force (MNF), a poor working relationship between the MNF and the United Nations Interim Force in Lebanon (UNIFIL), the absence of time limitations on the MNF, the violation of the non-use-of-force principle, the lack of consent and co-operation among the parties concerned, and the erosion of public trust in the MNF peacekeeping effort — all contributed to greater instability, thereby increasing tensions among the central protagonists.[49]

Given the severe limitations on and, indeed, the failure of conventional peacekeeping methods in Lebanon, it is fair to ask whether there is a better way to prevent another eruption of retaliation and counter-retaliation along the Israel-Lebanon border that could ultimately ignite another war between Israel and Syria. In the wake of the Israeli withdrawal from Lebanon (except for an Israeli-defined security zone) there would appear to be an opportunity to employ early warning detection devices along with rigorous verification of any newly defined buffer and limited forces zones. New security arrangements could, in fact, be verified with the assistance of a reconstituted observer force.

Surveillance technology could play a significant role in developing the confidence-building process among local disputants. Improved surveillance and warning devices, including a combination of implanted sensors, airborne radars with improved land contrast capability and improved sensor packages for remotely piloted vehicles (RPVs), could deter guerrilla movements and dampen Israeli and Syrian incentives for pre-emptive action.

Obviously, the success of any new early warning and verification system along this border would depend to a considerable degree

[47] *Ibid.*, p. 98.

[48] This problem may prove to be insurmountable if appropriate Palestinian "stakeholders" in any new security relationship for Israel and Jordan cannot be found. Should, however, there be an international peace conference which included an "approved" Jordanian-Palestinian delegation, this could pave the way for greater flexibility in restructuring security relations along the West Bank-Jordan River Valley.

[49] For an excellent discussion of peacekeeping problems in Lebanon see Richard W. Nelson, "Multinational Peacekeeping in the Middle East and the United Nations Model", *International Affairs* (London), Vol. 61, No. 1 (Winter 1984-85).

on Syria's acquiescence and assessment that the new systems and procedures would not serve as intelligence gathering platforms from which Israel could "see" into nearby Syria and Jordan.[50] All parties, moreover, would have to agree on the appropriate taskings, composition, equipment and deployment of the observer force responsible for operating the early warning mechanisms and carrying out the verification mission.

Case 4
BORDER/REGION: Central Europe
PARTIES: Members of NATO and Warsaw Pact
POTENTIAL VERIFICATION REGIME:
— National Means
— Multilateral Means
— Multilateral Consultative Mechanism

Of all the settings where the Sinai model might have some relevance, none presents a greater challenge than Central Europe where the superpowers are directly engaged in safeguarding their respective vital interests. Such extensive involvement by the US and the Soviet Union in this region has, of course, important implications for successfully implementing any proposed disengagement scheme. To begin with, it cannot be readily assumed that either the superpowers or their European allies would favour such a scheme. For the superpowers, it seems unlikely that either would, in a confrontation, accept that its guard could be lowered substantially as a result of the presence of additional early warning measures and zones of limited forces. For NATO's European members, efforts to establish a verification system and joint restrictions of limited forces zones could accentuate political differences between those countries whose troops and territories would be covered by the reduction and verification areas and those not affected.[51] Similarly, the Soviet Union would be concerned that any proposed constraints neither undermine its control of its East European clients nor prevent Moscow from responding to supposed Western threats and sowing disunity among the NATO allies.

Beyond the political impediments likely to be encountered in implementing a modified version of the Sinai model in Europe, there are a number of technical challenges that must be addressed in designing a workable disengagement and verification system. These are outlined below.

[50] The technology used in many verification systems is frequently the same technology used for intelligence gathering. Moreover, as verification capabilities are further enhanced, the data collected by such systems may become increasingly useful for non-verification purposes. This problem may be exacerbated in regional settings like the Middle East where states not party to a new agreement may feel threatened by the presence of such systems ostensibly used for verification purposes.

[51] Christoph Bertram, "Mutual Force Reductions in Europe: The Political Aspects", *Adelphi Papers*, No. 84 (London: International Institute for Strategic Studies, 1972), p. 14.

a) *Signal-to-Noise Ratio: Problems of Terrain and Traffic*

A verification system that included early warning stations (linked to networks of unattended ground sensors) situated in the Fulda Gap or along the intra-German border would be subject to several different kinds of "clutter" not found in the Sinai environment. For example, while the SFM had to identify and distinguish among sensor activations triggered by vehicles and nomadic Bedouin tribes in a relatively barren environment, early warning detection systems placed along the Fulda Gap/Intra-German border would need to cope with multiple "noise" sources emanating from surrounding mountains, rivers, and forests as well as from human activity such as the vehicular traffic of nearby communities. From an operational standpoint, separating "true" signals (serious indications of breach of compliance) from surrounding "noise" could prove very difficult. The overall success of the verification system would clearly depend on keeping the false alarm rate within manageable limits.[52]

b) *The Problem of Defensible Borders*

In the European setting, the problem of defensible borders is exacerbated by dynamic technological innovation which manifests itself in highly mobile and accurate dual-capable weapons systems. Central Europe is the most militarized region in the world as well as the repository of the world's most advanced military technology. Parties contemplating participation in a disengagement and verification scheme would need to assess the impact of technological developments (particularly, highly accurate long-range stand-off weapons and the possible introduction of biological and chemical weapons) on weapons and forces deployed to the rear of demilitarized zones, penetrability of borders, the mobility of forces in peace-time and in crisis, and intelligence gathering. Most important, potential participants would need some assurance that the verification system itself could cope with interference (both intended and unintended) and could adjust to the deployment of new weapons systems so as not to reduce warning time or incrementally erode the verification mission over time.[53]

52 Depending on the local topography where the verification system is situated, surrounding noise and clutter may be so great as to continually activate ground sensor systems, thereby degrading their operational utility and effectiveness. To make this problem more manageable, redundant ground sensor systems and watch-stations are required along with sufficient aerial and space surveillance to "double check" the findings of the verification system's other components.

53 It is important to note that the variable of technological dynamism, particularly as it influences the effectiveness of early warning systems (and associated sensor packages) over time, may be more critical in the European context than in any of the other cases examined here. In Central Europe, the presence of dual-capable weapons systems, the rapid modernization of existing weapons systems and the sheer size of opposing standing forces suggest that verification systems designed for this setting must be far more responsive to the demands of changing technology than might be the case in certain third world settings where the rate and scope of technological change is not nearly so pronounced.

c) *The Problem of Asymmetrical Constraints*

A willingness to accept constraints on force and manpower deployments may be strongly influenced by the degree to which the proposed constraints will operate equally on both sides. In the Sinai experience, with only two principal parties, this problem was managed effectively in two ways. First, the US provided Egypt with its own national surveillance station identical to the one Israel operated, thereby providing the disadvantaged party with a parallel capability. Second, by agreeing to interpose US civilians in the early warning system separating the two sides, the US provided Israel with a measure of tangible reassurance as it began to exchange territory for peace.

A cursory glance at the map of Europe suggests the presence of significant asymmetries which would appear to favour the military position of the Warsaw Pact nations. For example:

- The distance between the western border of the Soviet Union and the central demarcation line through Germany is between 600 and 700 km; the distance from this central line to the US — spanning the Atlantic Ocean — is some 5 000 km.
- The Warsaw Pact, unlike NATO forces, enjoys the military use of a wide unconfined geographical area for deployments and movements under its central unified command.
- The continued absence of France from the NATO integrated military structure limits the NATO command area along the northern and eastern borders of France.
- Soviet territory is not within direct operational range of NATO forces deployed in Western Germany, while Soviet and other Pact forces in Central Europe are close to the entire territory of the Federal Republic.

Restrictions on Western troop movements within the geographic setting described above could complicate NATO's strategy of forward defence and necessitate an increase in defence integration and mobility. Under any proposed disengagement scheme, NATO forces would need to retain the capacity to promptly deter any massive reintroduction of Pact forces into the limited-forces zones as well as safeguard against small incremental violations. By contrast, the Warsaw Pact is in a far more advantageous geographic position to accept troop restrictions since such restraints would do little to jeopardize overall defence preparedness.[54]

d) *Impediments to Identifying a Credible Third Party for Verification*

The Sinai experience clearly showed that a credible third party with sufficient political clout, technical expertise and economic resources to commit to a peace-building process can help ensure the successful implementation and operation of a verification system. However, before attempting to determine how third-party-assisted verification might be applied in Europe, it is worth highlighting some of the unique aspects of the Sinai experience in this regard. First, in the aftermath of bitter hostilities, Egypt and Israel urgently needed the US to help them "save face", in effect, by having an agreement

[54] For a discussion of Warsaw Pact strategic advantages in Central Europe see Lothar Ruehl, "MBFR: Lessons and Problems", *Adelphi Papers*, No. 176 (London: International Institute for Strategic Studies, 1982), p. 4. See also John Keliher, *The Negotiations on Mutual and Balanced Force Reductions: The Search for Arms Control in Central Europe* (Boulder: Westview Press, 1981), p. 131.

virtually imposed upon them. This is not currently the situation in Europe where the countries of East and West share a "cold peace" and have no urgent need for third-party assistance.[55]

Second, the US was able to offer the parties a level of resources and verification expertise that neither could hope to match. Thus Egypt and Israel were clearly dependent on an extra-regional third party. In the European context, however, where the superpowers would be principal parties to any agreement, it is likely that participants would collectively possess the technical expertise and financial resources necessary for verification and would not, therefore, require or desire extra-regional assistance. There would be little inclination to accept a verification regime "imposed" by a third party as was the case in Sinai.

Finally, whereas the UN — in conjunction with the US — played an important third-party role in verifying compliance with the Sinai II Agreement, it is unlikely that members of either European alliance would find the UN a credible alternative, even within a limited geographic area, to self-sufficiency. In addition, fear of politicization of sensitive security issues by the UN would further militate against reliance on a supervisory force that could not act quickly, discretely and decisively to resolve disputes.

Bearing in mind these important qualifications, it is possible to envisage European parties to a multilateral agreement consenting to some kind of third-party verification, perhaps a regional grouping composed of all or some signatories to the agreement. It is also conceivable that a verification commission composed of the neutral and non-aligned nations might be acceptable to the parties. The success of a multilateral verification system could well depend on the very process by which membership in such a system is negotiated.

[55] For analytical and practical purposes, it is best to divide third-party roles into those required for stabilizing conflict-prone situations (i.e., extra-regional actors facilitating a settlement between local adversaries) and those that would constitute a natural outgrowth from a negotiation process among states with no urgent need for conflict settlement. Different types of third parties may be necessary to fit the requirements of each situation.

e) *Designing Effective Verification Procedures for Central Europe*

It is important to note that the Stockholm Document already provides some of the elements that could serve to buttress the verification measures discussed above. For example, the participating states have agreed to give prior notice and allow observation of certain military activities and to employ national technical means (NTM) in monitoring compliance with agreed confidence and security-building measures (CSBMs).[56] Of particular relevance to the disengagement and verification scheme discussed here are the verification provisions of the Stockholm Document that allow participating states to conduct on-site and aerial inspections within the zone of application.[57] In addition, the establishment of reporting and communication procedures associated with verifying the agreed CSBMs could clearly be integrated into the inspection, reporting and consultation mechanisms associated with the operation of a demilitarized buffer zone and early warning watch stations in the Fulda Gap/Intra-German border area.

[56] The Document of the Stockholm Conference of September 19, 1986 states that: "The participating states recognize that national technical means can play a role in monitoring compliance with agreed confidence- and security-building measures", Paragraph 64.

[57] Regarding on-site inspection, the Document of the Stockholm Conference of September 19, 1986 states: "In accordance with the provisions contained in this document each participating state has the right to conduct inspections on the territory of any other participating state within the zone of application for CSBMs", Paragraph 65. In terms of the aerial regime, the Stockholm Document states: "Aircraft will be chosen which provide the inspection team with a continuous view of the ground during the inspection", Paragraph 89.

f) *The Geographic Setting: Fulda Gap/Intra-German Border*

The most suitable setting for an early warning system would appear to be in the Fulda Gap area with closely monitored limited forces zones established along the intra-German border as part of a disengagement and buffer zone arrangement. While the physical features of the Sinai and the Fulda Gap/Intra-German border are quite different, they are very similar in one crucial respect: both share terrain features that compel an adversary contemplating an attack to channel forces through narrow attack corridors.[58] In the Sinai, the Gidi and Mitla passes proved to be the only viable attack corridors. Similarly, in the central European setting, four principal attack corridors are available, each with its own natural barriers to rapid military advance.

It is at the entrances to these attack corridors, on either side of the border and in the Fulda area in particular, that early warning watch-stations, networks of unattended ground sensors and aerial/on-site inspection of limited forces zones could be situated. The greater number of available attack routes in the European setting would require more extensive use of watch-stations, unattended ground sensors and monitoring by aerial and space reconnaissance. (Of course, an extensive use of watch-stations raises the problem of "non-legitimate" intelligence gathering by these stations.) The need for greater use of surveillance technology could perhaps be managed through the introduction of new sensor technology developed since the Sinai experience. For example, watch-stations could now be remotely controlled and improved ground radars, imaging sensors and night-vision devices could enable the detection and classification of military movements, personnel or military equipment at a range of 10 to 20 km.[59]

g) *Extending the Concept of Limited-Forces Zones*

Zones that gradually thinned out military forces in order to reduce the threat of attack were an integral part of the Sinai experience. In Europe, specified zones from which particular forces would be banned or within which certain weapons could not be deployed, would be essential for the success of the enterprise. For example, along the intra-German border, an initial thin buffer/border zone could be limited to civilian national police and a small number of border patrol units. The early warning areas could be located in the attack-invasion corridors within this initial buffer zone. The next zone could allow limited military forces with the final zone, furthest from the border, reserved for standing armies. This last zone would incorporate the concept of rear-basing of tanks, artillery, bridging equipment, tactical strike aircraft and battlefield nuclear weapons.

The types of zones suggested here could be implemented even with persisting military asymmetries between East and West, though the task would be considerably more complicated than in the case of Egypt and Israel, especially given the presence of long-range weapons. Most importantly, the implementation of limited forces and buffer zones would constrain military options, dampen incentives to strike first and provide at least a marginal increase in the strategic and tactical warning time of attack. Such

[58] David Barton, "The Sinai Peacekeeping Experience", p. 558.

[59] *Ibid.*, p. 553.

reassurance might help build confidence on both sides. It should be noted, however, that the Soviet Union might have other incentives for maintaining substantial armed forces in Eastern Europe such as the need to support the incumbent regimes there. This could greatly complicate negotiations regarding the creation of these types of zones. It is also important to note that adoption of these zones could involve significant modification of NATO's current doctrine of forward defence.[60]

h) *Verification and Compliance*

If both sides were to agree to the presence of a demilitarized buffer zone flanked by limited forces zones, it is conceivable that some form of multilateral third-party group could administer the implementation of the zones and respond to complaints stemming from disputes over force and manpower levels in the various zones. As mentioned previously, the verification body could be composed of parties to the agreement. More precisely, a multilateral NATO/WTO body might be responsible for ground verification, including operation of the early warning stations as well as organizing and dispatching quick-reaction inspection teams. These teams would report violations to the verification body and to the parties directly involved. At the same time, a "plurilateral" group — that is, a like-minded subset of the parties — might be

△ Members of Canadian Armed Forces are shown on duty as peacekeepers in the Middle East. The control of buffer zones by UN personnel, through on-site inspections and the operation of observation and control posts, was an important element of the Sinai disengagement process. Sinai Field Mission civilian personnel also played a key role as on-site inspectors. (Canadian Forces Photo).

[60] *Ibid.*, p. 555. It is likely that adoption of the concept of graduated zones of arms limitations might require modification of NATO's strategy of forward defence. This would probably be a particularly sensitive issue for the Federal Republic of Germany with its need to safeguard the capability to engage hostile forces as close to enemy territory as possible.

responsible for aerial and satellite reconnaissance.[61] This functional division of labour might work well, as in the Sinai experience, where verification responsibilities are shared amongst different third parties as well as the parties to the agreement.

Of course, military disengagement plans and provisions for the operation of verification procedures for Central Europe are not novel. As early as 1955, a draft treaty on German reunification specified the adoption of zones of limited forces. The 1955 document called for "levels of armed forces which would be specified so as to establish a military balance"[62] and the provision of radar warning systems to be operated by the Soviet and East Europeans in the Western part of the limited forces zone with a similar system in the Eastern part of the zone to be operated by NATO.

In 1958, the Soviets proposed the establishment of 28 jointly manned control points in Central Europe and an 800-km-wide zone for aerial inspection along the East-West border. More recently, at the talks on Mutual and Balanced Force Reductions (MBFR) in Vienna, there have been extensive discussions on the monitoring of entry/exit points for any agreed-upon reduction zone.[63] Perhaps most importantly, as a result of new developments in sensor technology, the Soviets might now find a verification system that involved remote sensing more acceptable politically than one predicated exclusively on a high degree of intrusiveness by inspectors or observers. As will be recalled from the Sinai experience, technology-intensive verification proved useful in circumventing problems of sovereignty.

To date, both NATO and the Warsaw Pact have not altered their respective cost-benefit calculations for disengagement. Both sides still firmly believe that standing forces, and not reserve forces positioned far from the intra-German border, determine crisis stability, strengthen deterrence and allow for the exercise of territorial control. Nevertheless, despite the lack of movement toward large-scale disengagement of ground forces in Central Europe, manpower and financial constraints may ultimately compel both sides to seek alternative security arrangements that are more cost-effective and use less manpower. Buffer zones, together with verified zones of limited forces and early warning watch stations could provide part of the solution.

61 The idea of plurilateral verification is a variant of the multilateral variety, which refers specifically to verification undertaken by like-minded parties to an agreement. Plurilateral verification assumes the sovereign equality of all parties with respect to participating in the verification system. However, direct participation of all states in every aspect of verification activity — especially in the European context — could result in the duplication of capabilities and engender unworkably complex and cumbersome procedures. This problem may best be remedied by delegating certain verification tasks to a sub-group of the parties who possess the capabilities and willingness to perform these activities.

62 See C. Krause "Theory and Conception of CBM in East and West", Study for the Research Institute of the Friedrich-Ebert-Stiftung, Bonn, FR Germany, 1980, pp. 16-17. Cited in D. Barton, "The Sinai Peacekeeping Experience".

63 At the MBFR talks, both East and West have suggested that permanent entry/exit posts be established where observers from the opposite side could monitor movements of military units in and out of the region of reduction, in order to ascertain that the agreed level of forces was not violated. Any detected movement of military forces into the region of reduction through these entry/exit points that was not in accord with agreed ceilings could be construed as threatening. This growing concern with the operational side of arms control and verification in Europe has been reflected in recent efforts to link talks on conventional force reductions with the CSBM package produced at Stockholm on September 19, 1986. For an excellent discussion of the latter point see Richard E. Darilek, "The Future of Conventional Arms Control in Europe", *Survival* (January/February 1987), pp. 5-21.

2. Other Potential Candidates for the Sinai Model

Only four cases have been outlined above as potential candidates for the application of the Sinai model. Other *prima facie* candidates that deserve further study include various borders in Central America in the context of the Contadora process, Northern Ireland, the Western Sahara, South Africa/Namibia, India/Pakistan and Iran/Iraq[64] as part of a postwar settlement.

3. Potential Impediments to Applying the Sinai Model

It is clear from the foregoing discussion of these cases that the ideal conditions under which the Sinai model was successfully employed may not be fully replicated in other settings. A number of potential impediments to transposing the model directly can be identified:

- In regional settings where more than two parties are engaged in managing a dispute, the task of establishing a verification system suited to the security needs of all the parties could become much more difficult to co-ordinate and implement, especially where sub-national groups and guerrillas might resist any new agreement. The prospects for success may depend on how well outside groups and states are initially integrated into the negotiation process over new disengagement arrangements. In short, where several parties are involved, incentives to co-operate may not be shared equally by all. Some actors may simply want the security benefits derived from a verification system (i.e., the early warning detection and deterrence functions) without wanting the long-term objective of confidence-building and improvement of relations.[65]
- To be effectively implemented in other regions the verification system must be flexible so as to accommodate an appropriate mix of verification technology and manpower in accordance with changing political requirements over time. A lack of

[64] While the seven-year-old war between Iran and Iraq at present shows no signs of abating, it is worthwhile, nevertheless, to anticipate the kind of verification regime that might be most appropriate for verifying a ceasefire and ultimately a disengagement agreement requiring zones of thinned out forces. Clearly, assistance for some portion of the verification system would have to be provided by third parties from outside the region who might then co-ordinate their activities with the Gulf Council on Co-operation. For example, a designated UN peacekeeping mission could establish and operate observation posts and early warning watch stations in the area surrounding such critical strategic points as Basra. Given recent US difficulties in reconstituting a dialogue with Iran, it might be most appropriate if members of the neutral and non-aligned countries took the lead in contributing to the verification of postwar agreements. In this connection, a recent Swedish proposal (July 1985) may suggest one possible approach in the Iran-Iraq context. The Swedes have called for the creation of an Arms Control and Conflict Observation Satellite (ACCOS) to be operated by a number of neutral and non-aligned nations. According to the proposal, "the mission of this system should be not only to monitor arms control arrangements but also collect information and data particularly on the crisis sensitive areas in order to make it possible to avert the crisis developing into a major conflict." The data collected by the satellite could be made available to a consultative commission composed of various members of the Gulf Council on Co-operation. For further details of the Swedish proposal see Bhupendra Jasani and Toshibomi Sakata (editors), *Satellites For Arms Control and Crisis Monitoring*, (SIPRI), (Oxford: Oxford University, 1987), pp. 41-43.

[65] The classic purposes of verification include detection, deterrence and confidence-building. In terms of detection, the parties are interested in finding possible violations of an agreement and providing timely warning of any threat to security arising under an agreement to strengthen deterrence. Parties to an agreement need to forestall violations by increasing the likelihood of detection and preventing schemes of circumvention. Confidence-building, the third purpose of verification, refers to the development of trust in the viability of the new security arrangements. While it is questionable whether any of these purposes can be conceived as independent ends in themselves, it may be argued that in acute conflict settings, trust-building is given a somewhat lower priority. In other cases, however, it may be more appropriate to see the various functions of verification as interdependent and cumulative. As Richard Darilek notes: ". . . one's ability to detect improves with the ability to deter and the ability to do both — that is both detect and deter — is what actually produces the confidence." See Richard E. Darilek, "Political Aspects of Verification: Arms Control in Europe", in *A Proxy For Trust: Views On The Verification Issue in Arms Control and Disarmament Negotiations* (Ottawa: Carleton International Proceedings, The Norman Paterson School of International Affairs, Carleton University, 1985), p. 65.

flexibility and innovation could undermine the maintenance of a durable verification regime.

- Terrain and environmental/climatic factors may affect the possibility of detection, target discrimination, area coverage, false alarm rate, ease of operation and maintenance, communication links, preservation and distribution of raw data from sensors, types of raw data from sensors, sensor types and platforms, reporting conventions, control and management of the system, and direct participation in the system by the parties to the conflict.
- Though the Sinai model appears particularly well suited to disputes where the proximity of hostile forces invites confrontation and heightens fears of surprise attack, such conditions alone will not ensure the successful application of the model. Gross asymmetries in organizational/technological sophistication and operational doctrines may affect utility calculations regarding the interposition of third parties and technical systems to assist in the verification of agreements, particularly if these were perceived (especially by the weaker side) to be used for intelligence gathering purposes.

4. Implications of the Sinai Experience for Canada

The foregoing analysis of the Sinai experience and its potential application to other borders and regions has shown that various components of the Sinai model, appropriately modified, could make an important contribution to stability and confidence-building in other parts of the world. What is less immediately clear are the ways in which Canada might contribute to the kinds of conflict resolution initiatives that would involve the design, implementation and maintenance of regional verification systems.

That Canada might wish to adopt a more active role in this area could be viewed as a logical extension of an ongoing commitment to international peacekeeping. Canada has a long history of participation in UN peacekeeping operations including, among others, the United Nations Disengagement and Observer Force (UNDOF) on the Golan Heights, the Cyprus peacekeeping force (UNFICYP) and more recent participation in a non-UN mission, the Multinational Force and Observers (MFO) in the Sinai. Canada's participation in the MFO in particular has important implications for longer-term Canadian involvement in the resolution of regional conflicts.

On April 12, 1985, in response to requests from Egypt and Israel, the Canadian government agreed to participate in the MFO, the multinational peacekeeping group charged with verifying compliance with the security provisions of the 1979 Egypt-Israel Peace Treaty. The Canadian contingent, which officially assumed active duty on March 31, 1986, replaced a combined Australia-New Zealand peacekeeping force which had provided the MFO with helicopter support since its inception in 1982. Canada's contribution to the MFO consists of the Rotary Wing Aviation Unit, flying nine CH-135 Twin Huey helicopters, with associated support. The overall responsibility of the Canadian contingent is one of aviation support; the specific contribution to verification includes the observer mission (both reconnaissance and verification), temporary observation post insert/extract, logistic support, and search and rescue standby.[66]

This is the first peacekeeping force Canada has agreed to join that has not been officially sanctioned by the United Nations, suggesting that Canadian policymakers may be prepared in certain circumstances to accept the challenge of promoting international peace and security even in the absence of traditional institutional mechanisms as offered by the United Nations. Given that further peacekeeping missions may lack the political support or logistical infra-structure provided by an international organization, Canada could be called upon again to offer manpower and expertise. In short, a transition to non-traditional modes of peacekeeping might provide Canada with a unique opportunity to innovatively apply multimethod peacekeeping and verification techniques to a variety of regional conflict situations.

One area which proved to be a key ingredient of success in the Sinai Field Mission — private industry expertise — holds particular

[66] M.R. Dabros (Captain), "The Multinational Force and Observers: A New Experience in Peacekeeping for Canada", *Canadian Defence Quarterly* (Autumn 1986), pp. 32-35.

△ Canadian Armed Forces helicopters of 408 Tactical Helicopter Squadron operate as part of the Multinational Force and Observers (MFO) in the Sinai. Canadian personnel provide helicopter support to the MFO, including observation and verification, command and control, logistic support, search and rescue, medical evacuation and air traffic control. During the operation of the Sinai Field Mission (SFM), aerial reconnaissance, including observations from helicopters, formed one component of the verification system. (Canadian Forces Photo).

promise for Canada. With their expertise in telecommunications, electronics, radar and infra-red technology, several Canadian firms as well as federal government agencies could produce many of the sensing devices and much of the optical equipment used for early warning and verification procedures.[67] This technological expertise could be employed by the United Nations or an international verification agency of which Canada could be a leading member. In this way, Canada could make a significant contribution to peacekeeping as well as advance through further research the "state of the art" in those sensor technologies appropriate for verification tasks. A major challenge here, however, is to educate the relevant industries of the technological requirements and opportunities of verification.[68]

[67] To get a better sense of Canadian capabilities in this area, it would be useful for government and academic researchers to generate an inventory of Canadian expertise relevant to the verification technology used in the arms control context.

[68] The education process suggested here might begin with the initiation of an industry-government roundtable on arms control that would focus on the presentation of technical briefings and policy papers by government and industry representatives on the subject of verification. The roundtable would seek to anticipate arms control and verification needs with a view toward specializing in those technologies where Canada is already at the leading edge.

Table 2
Canadian Armed Forces Participation in International Peacekeeping Forces and Observer Missions — 1947 Onwards*

Operation	Location	Dates	Maximum Troop Contribution	Current Troop Contribution
United Nations Command Korea (UNCK)	Korea	1950-54	8 000	—
United Nations Emergency Force (UNEF I)	Egypt	1956-67	1 007	—
Organisation des Nations Unies au Congo (ONUC)	Congo	1960-64	421	—
United Nations Temporary Executive Authority (UNTEA)	West New Guinea (now West Irian)	1962-63	13	—
United Nations Force in Cyprus (UNFICYP)	Cyprus	1964-	1 126	515
United Nations Emergency Force (UNEF II)	Egypt (Sinai)	1973-79	1 145	—
United Nations Disengagement Observer Force (UNDOF)	Israel Syria (Golan Heights)	1974-	220	220
United Nations Interim Force in Lebanon (UNIFIL)	Lebanon	1978 (Apr-Sep)	117	—
United Nations Temporary Commission on Korea (UNTCOK)	Korea	1947-48	Unknown	—
United Nations Military Observer Group India-Pakistan (UNMOGIP)	Kashmir	1949-79	27	—
United Nations Truce Supervisory Organization Palestine (UNTSO)	Egypt Israel Jordan Lebanon Syria	1954-	20	20
United Nations Command Military Armistice Commission (UNCMAC)	Korea	1953-	2	1
United Nations Observer Group in Lebanon (UNOGIL)	Lebanon	1958-59	77	—
United Nations Yemen Observer Mission (UNYOM)	Yemen	1963-64	36	—
United Nations India-Pakistan Observer Mission (UNIPOM)	India-Pakistan Border	1965-66	112	—
International Commission for Supervision and Control (ICSC)	Cambodia Laos Vietnam	1954-74	133	—
International Commission for Control and Supervision (ICCS)	South Vietnam	1973	248	—
Observer Team to Nigeria (OTN)	Nigeria	1968-69	2	—
Multinational Force and Observers (MFO)	Egypt (Sinai)	1986-	136	136

*Source: Canada, Department of External Affairs, *Disarmament Bulletin* (Winter 1985-Spring 1986), p. 16 and (Summer-Fall 1986), p. 17.

Conclusion

Having analyzed the use of multimethod verification in the Sinai and then considered the Sinai model in other contexts, it is appropriate to return to the propositions posed at the outset of this study and to offer some tentative conclusions.

- *Proposition 1*
  Arms control and verification regimes can be created and sustained in regions plagued by endemic violence.

The Sinai experience provides clear evidence that an arms limitation and verification regime can be developed and sustained in regions plagued by endemic violence. Once parties trapped in a long cycle of bitter hostilities with no history of political co-operation accept that they can no longer impose unilateral solutions on each other and decide further to achieve some of their security objectives jointly, then an opportunity to manage the conflict in less costly ways becomes available.

At this juncture, a credible and vigorous third party may prove critical in facilitating the design of an initial disengagement formula that does not undermine military-strategic positions and establishes tangible indicators of compliance.

With acceptance of the disengagement formula, the parties may then develop the norms, rules and procedures necessary to ensure effective verification of the agreement. In regions of persistent violence, more than a single third party, each with its own source of legitimacy and verification responsibilities, may be necessary to ensure the political and military success of the enterprise. As the Sinai experience illustrates, sustaining the verification regime in this kind of setting is likely to depend on a series of multimethod and interlocking verification responsibilities that provide the parties with reassurance and a sense of fairness.

- *Proposition 2*

  Third parties can facilitate the creation of arms control regimes as well as assist the parties in verifying new agreements.

Clearly, in the aftermath of hostilities or in situations where there is no credible local third party, a trusted third party from outside the region may act as the essential catalyst in helping to create a verification regime and, in the process, directly assist the parties in managing the risks of any new agreement. As the key role played by the US in the Sinai showed, a third party with strong political commitment, financial resources and a willingness to make technical expertise available on a timely basis, can make the difference between the success or failure of the peace-building enterprise.

While it has been argued throughout this study that third-party roles are central to the creation of effective verification regimes in conflict-prone areas, it is important to emphasize that in the Sinai case, the role played by the US was unique and, as such, may not be readily applicable to other cases. This may suggest that in other regional settings requiring third-party-assisted verification, superpower involvement may be inappropriate or unnecessary. In other settings, such as central Europe, a disengagement agreement might be verified by a third-party group indigenous to the region or by various international organizations — both of whom might be more suitable to the verification task.

- *Proposition 3*
  Effective verification measures can contribute significantly to risk management and confidence-building in disputes where there is little or no history of conflict management.

In the Sinai experience, the relationship between verification and confidence is best indicated by the transition from the Sinai II Agreement (1975) to the signing of a formal Peace Treaty in 1979. The Treaty may be viewed, in part, as an extension of previous agreements through which the parties learned incrementally about the benefits of rule-making and reciprocally binding behaviour. Whereas in the early stages of the disengagement process the verification task focussed on early warning detection, a successful record of compliance over time gave the parties increased confidence in the verification system. The development of confidence

made the notion of "backsliding" (i.e., reneging on the agreement) increasingly less attractive and provided the parties with impetus to take greater risks for long-term peace as they were reassured that compliance with the Sinai II Agreement was not placing them in an unfavourable strategic position. That such confidence developed in an adversarial relationship where there was no history of conflict management is truly remarkable. This suggests that effective verification systems may be critical in contributing to confidence-building in similar adversarial relationships where the parties lack any degree of self-help and require incremental tests of the intentions of the other side.

- *Proposition 4*
  Technology-intensive verification procedures can be integrated with more traditional kinds of peacekeeping operations in order to strengthen the compliance process.

The Sinai experience suggests that compliance is strengthened when all the "stakeholders" to the agreement are appropriately included in maintaining the new agreement and when verification responsibilities are of an interlocking nature; both the parties to the agreement *and* the third parties (UNEF, SFM) are responsible for the success of the enterprise. Equally important, the use of multimethod verification — the integration of ground sensor technology, aerial surveillance and satellite reconnaissance with traditional peacekeeping operations — created, through a synergistic process, a novel system of checks that significantly strengthened the monitoring of compliance.

In other regional settings, the extent to which multimethod verification is feasible will depend on the nature of the agreement and the kind of terrain, forces and manpower levels to be verified. The Sinai experience clearly illustrated the importance of designing a verification system to meet the specific needs of the *parties* within the context of a new agreement.

- *Proposition 5*
  With appropriate modification, elements of the Sinai model can be applied to other regional conflict settings.

The cases analyzed here suggest that major elements of the Sinai model, appropriately modified to account for variations in mission, terrain and the number of parties, could indeed be transferred to other settings. The core elements of the model — a disengagement agreement composed of a demilitarized buffer zone flanked by zones of limited forces, all verified by a system of multiple interconnecting monitoring techniques — could do much to strengthen stability in conflict-prone areas.

Various components of the model might have to be expanded or contracted to produce a workable system depending on the case at hand. For example, the third party concept may have to be "elasticized" to incorporate different kinds of third parties (regional organizations, neutral and non-aligned nations) with several kinds of expertise. Perhaps a group of like-minded states, within a larger number of parties to an agreement, with a special technical expertise could manage a specific portion of the verification system. In addition, the extensive use of early warning stations and unattended ground sensors may have to be reconciled with the problems of intelligence gathering and the heightening of false alarm rates. Sensitivity to such problems at the outset of designing a verification system could do much to enhance its prospects for success. At a minimum, the very success of the Sinai model itself should lend impetus to serious initiatives in other regions.

- *Proposition 6*
  Third parties, including countries like Canada, can make a significant contribution to the verification of regional arms control agreements.

The success of the Sinai experience suggests that third parties, including countries like Canada, can play an important role in designing and implementing verification systems that would complement national means of verification. A contribution of this kind would appear to mesh well with broader Canadian foreign policy objectives and, more particularly, constitute an effective follow-on to the Program of Action announced by the Secretary of State for External Affairs at the United Nations General Assembly in September 1985.

Third parties may play different roles in the verification process ranging from the offering of technical and industrial expertise to direct forms of monitoring including participation in multilateral consultative arrangements. In the regional context, where the national technical means (NTMs) of the superpowers may be neither sufficient nor relevant to assure the viability of an agreement, third parties like Canada may be able to exert greater influence with the local parties. A trend toward increased multilateralization of the arms control process and verification systems at the regional level may, as James Schear suggests, lead to the development of new international norms and procedures whereby parties to an agreement specifically request the participation of other states in the monitoring of their agreement.[69]

Canada, through the expertise in its government agencies and in the private sector, certainly has the capacity to provide state-of-the-art sensor technology for multilateral verification. Moreover, the Sinai experience clearly indicates that the task at hand could be managed without resorting to extremely sophisticated levels of technology and that the capacity to adapt existing and proven technology imaginatively and quickly were qualities of greater importance. Such an anticipatory, quick reaction role might be one to which Canada should aspire. An opportunity to apply some of the lessons derived from the Sinai experience may soon come as the possibility of significant arms control initiatives appear in the regional context of Europe. It is here in the multilateral context that Canadian research into the verification methods and systems necessary for agreements could prove significant in facilitating the arms control negotiation process.

[69] James Schear, "National Methods of Treaty Verification and the Role of Third Countries: Compatibility or Conflict", *Journal of Arms Control*, Vol. 7, No. 1 (May 1986), pp. 10-16.

Bibliography

Alford, Jonathan. "Confidence-Building Measures in Europe: The Military Aspects". In "The Future of Arms Control, PART III: Confidence-Building Measures". *Adelphi Papers*, No. 149. London: International Institute for Strategic Studies, 1979.

Barton, David. "The Sinai Peacekeeping Experience: A Verification Paradigm for Europe." *World Armaments and Disarmament, SIPRI Yearbook, 1985*. London and Philadelphia: Taylor and Francis, 1985: 539-562.

Bertram, Christoph. "Mutual Force Reductions in Europe: The Political Aspects". *Adelphi Papers* No. 84. London: International Institute for Strategic Studies, 1972.

Blechman, Barry and Mark Moore. "A Nuclear Weapon-Free Zone in Europe". *Scientific American*, Vol. 248 (April 4, 1983): 37-43.

Borawski, John (editor). *Avoiding War In The Nuclear Age: Confidence-Building Measures For Crisis Stability*. Boulder, Colorado: Westview Press, 1986.

Brauch, Hans G. "Limiting Surprise Attack Options for Central Europe". *International Pugwash Proceedings*, 1978.

Camay, Michael. "UN Peacekeeping in the Israel-Arab Conflict, 1948-1975: An Israel Critique". *Jerusalem Papers on Peace Problems*, No. 17-18, (1976).

Canada. Department of External Affairs. *Disarmament Bulletin* (Winter 1985-Spring 1986):16 and (Summer-Fall 1986):17.

Canada. Department of External Affairs. *Verification In All Its Aspects: A Comprehensive Study on Arms Control Verification Pursuant to UNGA Resolution 40/152(o)* Ottawa: April 1986.

Cleminson, F.R. and Ernest Gilman, *A Conceptual Working Paper on Arms Control Verification*. Ottawa: Department of External Affairs, Arms Control Verification Studies No. 1, January 1986.

Coffey, J.I. "New Approaches to Arms Reduction in Europe". *Adelphi Papers*, No. 105. London: International Institute for Strategic Studies, 1974.

Crawford, Alan. *Compendium of Confidence-Building Proposals*. Ottawa: Department of National Defence, Operational Research and Analysis Establishment, ORAE Extra-Mural Paper #36, November 1985.

Dabros, M.R. (Captain). "The Multinational Force and Observers: A New Experience in Peacekeeping for Canada". *Canadian Defence Quarterly*, (Autumn 1986): 32-35.

Document of The Stockholm Conference on Confidence and Security-Building Measures and Disarmament in Europe convened in accordance with the relevant provisions of the Concluding Document of the Madrid Meeting of the Conference on Security and Cooperation in Europe. September 19, 1986.

Holst, Johan Jorgen. "Confidence-Building Measures: A Conceptual Framework". *Survival*, Vol. 25. No. 1 (January-February 1983): 2-15.

Houghton, Robert B. and Frank J. Trinka. *Multinational Peacekeeping In The Middle East*. Washington, D.C.: Foreign Service Institute, Center For The Study of Foreign Affairs, US Department of State, 1985.

International Peace Academy. *Weapons of Peace: A Report*. New York: International Peace Academy, 1986.

Jasani, Bhupendra and Toshibami Sakata. *Satellites For Arms Control and Crisis Monitoring* (SIPRI). Oxford: Oxford University Press, 1987.

Keliher, John. *The Negotiations on Mutual and Balance Force Reductions: The Search for Arms Control in Central Europe*. Boulder, Colorado: Westview Press, 1981.

Kissinger, Henry. *Years of Upheaval*. Boston: Little, Brown, 1982.

Kolcum. E. "New Sensors Evaluated in Sinai Buffer". *Aviation Week and Space Technology*, (August 23, 1976); 40-42.

Lewis, Kevin N., and Mark A. Lorell, "Confidence-Building Measures and Crisis Resolution: Historical Perspectives". *Orbis*, Vol. 28, No. 2 (Summer 1984): 281-306.

Macintosh, James. *Confidence (and Security) Building Measures in the Arms Control Process: A Canadian Perspective*. Ottawa: Department of External Affairs, 1985.

Nelson, Richard W. "Multinational Peacekeeping in the Middle East and the United Nations Model". *International Affairs* (London) Vol. 61, No. 1, (Winter 1984-1985): 67-69.

O'Manique, John. (editor). *A Proxy For Trust: Views On The Verification Issue In Arms Control And Disarmament Negotiations*. Ottawa: The Norman Paterson School of International Affairs, Carleton International Proceedings, 1985.

Pelcovits, Nathan A. *Peacekeeping on Arab-Israeli Fronts: Lessons from the Sinai and Lebanon*. SAIS Papers, No. 3. Boulder, Colorado: Westview Press, 1984.

Potter, William C. (editor). *Verification and Arms Control*. Lexington, Mass: Lexington Books, 1985.

Quandt, William. *Decade of Decisions*. Berkeley: University of California Press, 1977.

Ruehl, Lothar. "MBFR: Lessons and Problems". *Adelphi Papers*, No. 176. London: International Institute for Strategic Studies, 1982.

Safran, Nadav. *Israel: The Embattled Ally*. Cambridge MA: Harvard University Press, 1978.

Schear, James A. "National Methods of Treaty Verification and the Role of Third Countries: Compatibility or Conflict". *Journal of Arms Control*. Vol. 7, No. 1, (May 1986):3-16.

Tabory, Mala. *The Multinational Force and Observers in the Sinai: Organization, Structure and Function*. Boulder, Colorado: Westview Press, 1986.

Tsipis, Kosta, David W. Hafemeister and Penny Janeway, (editors). *Arms Control Verification: The Technologies That Make It Possible*. Washington, D.C.: Pergamon Brassey's International Defense Publishers, 1986.

Turner, Stansfield. "Opening the World Skies for Mankind". *Space Policy*, (November 1985).

Ury, William L. *Beyond the Hotline: How We Can Prevent The Crisis That Might Bring On a Nuclear War*. Boston: Houghton Mifflin, 1985.

U.S. Department of State. *U.S. Policy in the Middle East: November 1974 — February 1976*. Selected Documents, No. 4, 1976.

U.S. Department of State. *Watch in the Sinai*. No. 9131, General Foreign Policy Series 321, U.S. Sinai Support Mission, June 1980.

U.S. Department of State. *Peace in the Sinai*. U.S. Sinai Support Mission, 1983.

U.S. Department of State. United States Sinai Support Mission, *Report to the Congress* (a series of 13 reports from April 1976 to April 1982). Washington, D.C.: Department of State, 1976-82.

Arms Control Verification Studies
No. 1 *A Conceptual Working Paper on Arms Control Verification,* by F.R. Cleminson and E. Gilman, January 1986

Arms Control Verification Studies
No. 2 *The Role of Astronomical Instruments in Arms Control Verification,* by Chris A. Rutkowski, University of Manitoba, September 1986